
Final Report

**COASTAL ZONE
MANAGEMENT PLAN**

**CITY OF PORTSMOUTH,
VIRGINIA**

April 29, 1988

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COASTAL ZONE LAND USE PLAN
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PORTSMOUTH, VIRGINIA
COASTAL ZONE MANAGEMENT PLAN

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City of Portsmouth Planning Department, Engineering Department
and City Manager's Office

The Norfolk District of U.S. Corps of Engineers

The Council on the Environment

The Virginia Marine Resources Commission

The State Water Control Board

The Library and Wetlands Ecology Department
Virginia Institute of Marine Science

The State and Regional Offices
The Commission of Game and Inland Fish

The Virginia Natural Heritage Program
Division of Historic Landmarks and Virginia Outdoors Foundation
Department of Conservation and Historic Resources

The Southeastern Virginia Regional Planning Commission

EXECUTIVE SUMMARY

Portsmouth is part of the Norfolk-Virginia Beach-Newport News Metropolitan Area located in the southeastern Virginia area known as Hampton Roads (shown in Figure 1-1). As the area's population increases and stimulates commercial and physical growth, planning for future development becomes necessary in order to manage better the area's resources. As a result, the City of Portsmouth is updating its Comprehensive Plan. The City particularly wishes to manage more effectively its coastal lands and has selected Woolpert Consultants to prepare a Coastal Zone Land Use Plan (CZLU) for the 83.1-mile Portsmouth coastline. The Plan Report comprises three chapters.

Chapter I provides an overview of the Coastal Zone Management Program. It summarizes relevant federal, state, regional and local regulations. It explains the purpose of the Coastal Zone Land Use (CZLU) Plan. Existing baseline information was synthesized from plans and studies relevant to the CZLU Plan. The chapter concludes with a list of goals for Portsmouth's CZLU.

Chapter II comprises a summary of existing conditions, including an environmental and ecological analysis, an analysis of the built environment and an assessment of coastal zone impact dynamics.

Chapter III synthesizes the information from the previous chapters into a recommended plan. After noting significant coastal land use areas, the chapter enumerates recommended land uses along Portsmouth's shoreline, paying particular attention to undeveloped areas and agricultural uses that will probably undergo land use changes in the next few years. The chapter explains infrastructure and circulation requirements and recommends strategies to make Portsmouth's shoreline more accessible to the public. Finally, the chapter discusses environmental management strategies, focusing on construction and engineering considerations that can be implemented to optimize the use and conservation of coastal resources.

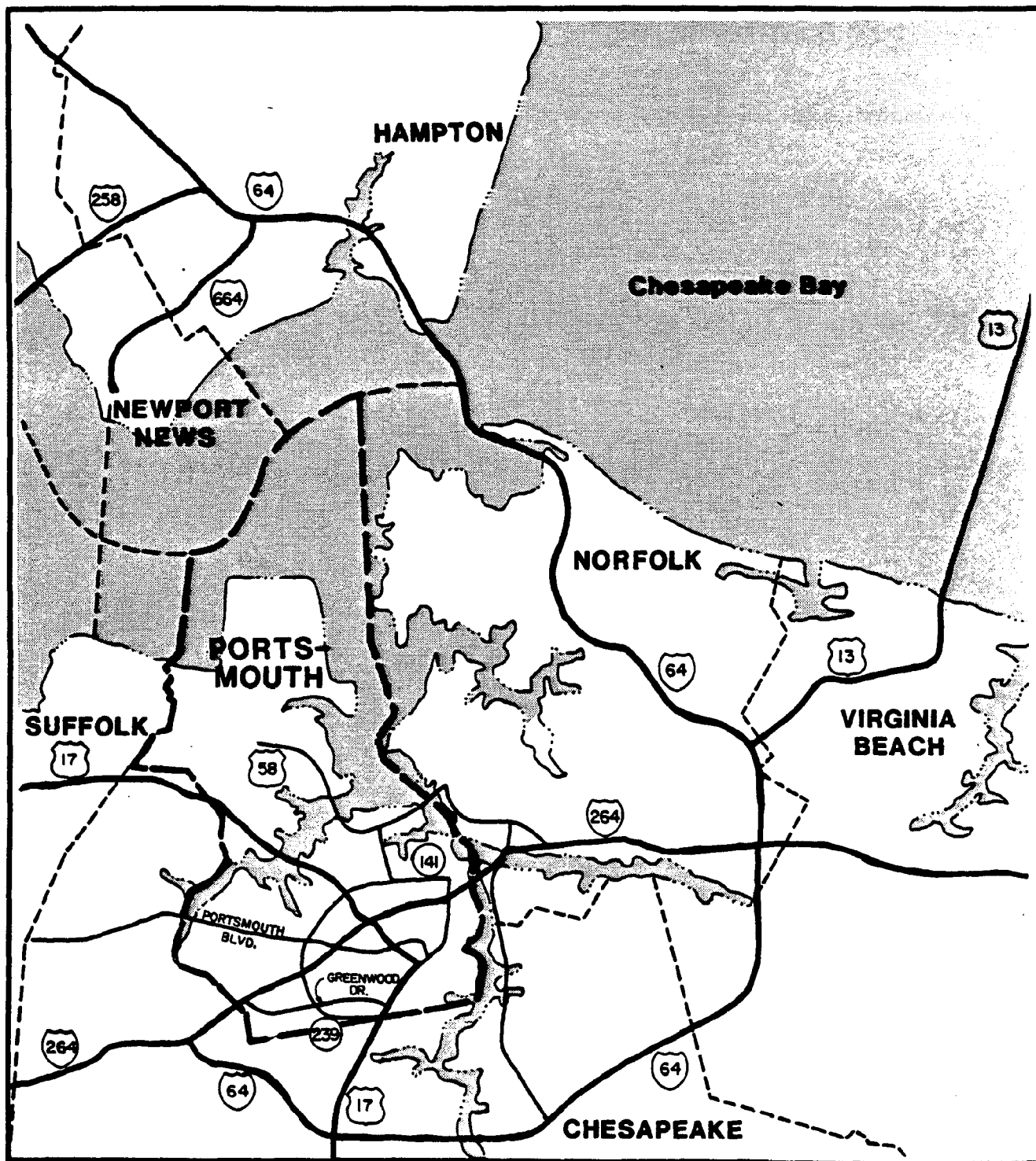


Figure 1-1
PORTSMOUTH AND VICINITY

CHAPTER 1 OVERVIEW OF THE COASTAL ZONE MANAGEMENT PROGRAM

This Chapter reviews the pertinent coastal zone regulations, describes the purpose of a Coastal Zone Land Use Plan (CZLU), synthesizes previous plans and studies and describes the goals and objectives of this plan.

I. PLAN RATIONALE

Very little attention has been paid to the Portsmouth shoreline even though, historically, the City has been significantly tied to the shoreline and maritime commerce. Today, the Portsmouth shoreline represents approximately 83 miles of mixed-use development with little remaining vacant land. Recently there has been a resurgence of interest in revitalizing the coast by various Portsmouth citizen groups. Also, the City of Portsmouth has become involved with the Virginia Coastal Resources Management Program, and the coastal area/shoreline component is critical to the City's effort to consider coastal land use and development issues in its update of the 1980 Comprehensive Plan.

The City has several concerns regarding development along the shoreline. Previous development has already destroyed many significant wetland areas along the City's shoreline, and the City is concerned with related issues such as erosion and water quality, the mix of land uses along the shoreline, the presence of only one public boat-launching facility and restricted public access to the shoreline.

Several significant studies of the shoreline are in progress.

- ° The Scotts Creek Study, in its final review by the City, is investigating market factors relative to the Scotts Creek area in consideration of a land use plan for this portion of Portsmouth's shoreline.
- ° The U.S. Army Corps of Engineers (Norfolk District) Study is investigating the feasibility of dredging through Scotts Creek to the Sugarhill area.
- ° A Land Use Study of the 91-acre West Norfolk Section is being performed for the Portsmouth Port and Industrial Commission.

- ° The City is in the process of updating its zoning and subdivision regulations and is looking forward to incorporating environmental and land use findings from the CZLU Plan into the City's development regulations.

A Coastal Land Use Plan for Portsmouth will provide goals, policies and recommendations to guide the physical growth and development of Portsmouth's shoreline. The plan described in this report does not identify the amount of land each use will require to accommodate future development. Neither does it allocate these land uses based on existing land use patterns, current market trends and land suitability. Rather, the plan described here is an environmentally-oriented land use plan that identifies and seeks to preserve environmentally sensitive areas that might be affected by development of areas adjacent them. Such a CZLU Plan is needed in a unique area such as the Portsmouth shoreline in order to ensure consistency, objectivity and efficiency in meeting Portsmouth's growth and development needs while protecting the vital natural resources located along the shoreline.

II. PERTINENT REGULATIONS

This section is not a comprehensive catalog of all legislation related to coastal zones; it is a brief outline of pertinent legislation, programs and coordinating agencies that could become involved in implementing this Plan's land use recommendations along Portsmouth's coastal zone.

FEDERAL LAW

National Environmental Policy Act of 1970 (42 USC 4371 et seq.)

The National Environmental Policy Act (NEPA) is the nation's basic charter to help public officials make wise land use decisions that protect our environment. The Act requires an environmental assessment or environmental impact assessment of any federally funded project that may significantly affect the social, economic or ecological components of the environment.

Federal agencies that comment on documents produced under NEPA include, but are not limited to:

- ° U.S. Environmental Protection Agency, Region IV, Atlanta Office
- ° U.S. Department of the Interior; Washington Office; Atlanta Regional Office
- ° U.S. Department of the Interior; Heritage Conservation and Recreation Service, Washington, D.C.
- ° U.S. Army Corps of Engineers, Norfolk District
- ° U.S. Coast Guard, 5th District (Portsmouth)
- ° U.S. Fish and Wildlife Service, District IV, Atlanta
- ° U.S. Department of Agriculture, Soil Conservation Service, Virginia Office
- ° U.S. Geological Survey, Richmond
- ° Federal Insurance Administration, Atlanta Regional Office

The Federal Coastal Zone Management Act of 1972
(P.L. 92-583, as amended 16 USC 1451)

The Federal Coastal Zone Management Act (CZMA) and its amendments (PL 94-370; PL 95-372; PL 96-464) authorize a federal grant-in-aid program that allows for development of State Coastal Resource Management Programs. It is administered by the Secretary of Commerce through the National Oceanic and Atmospheric Administration's (NOAA) Office of Ocean and Coastal Resources Management (OCRM).

The CZMA and implementing regulations (44 FR 18595), as codified (Title 15 CFR Part 923), outline national objectives, provide the requirements for federal approval of state program grants and describe how grant monies are to be used to achieve agreed upon objectives. The CZMA contains federal consistency-review provisions to ensure that federal actions are consistent with the state's federally-approved management program. The CZMA also contains response provisions for onshore impacts of coastal energy activities.

The River and Harbor Act of 1899
(33 U.S.C. 401-413)

This Act is administered by the U.S. Army Corps of Engineers (USCOE) to protect navigation and navigable capacity of the nation's waters. The Act requires USCOE approval for the construction of any structure, dredging and rechannelization in or over any "navigable water" of the United States.

The Clean Water Act of 1977 et seq.
(P.L. 92-500)

Section 404 of the Clean Water Act (formally known as the Federal Water Pollution Control Act), requires USCOE authorization for the discharge of dredged or fill material into all "waters of the United States." This includes wetlands (both tidal and nontidal) and territorial seas.

The Marine Protection, Research
and Sanctuaries Act of 1972
(P.L. 92-532 et seq.)

Section 103 of this Act requires USCOE authorization to transport dredged material to be dumped in marine waters.

Presidential Executive Order No. 11990
"Protection of Wetlands" (FR Doc. 77-15123)

This Act requires all federal agencies to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out federal actions affecting land use. This Act includes, but is not limited to, water (and related land resources) planning, regulating and licensing activities. The Act is concerned with public welfare, sediment and erosion control and maintenance of natural systems.

Presidential Executive Order No. 11988 and 12148
"Floodplain Management" (44FR 43239)

This Act requires federal agencies to reduce the risk of flood loss; to minimize the impact of floods on human safety, health and welfare; and to restore and preserve the natural and beneficial values served by floodplains. The Act reviews projects in 100-year floodplains for alternative upland sites. Water-dependent projects such as marinas and boat ramps are only required to consider design modifications to minimize potential harm to or within the floodplain and to circulate a notice explaining why the project is proposed within the floodplain.

Note: The U.S. Environmental Protection Agency (USEPA) complies with Executive Orders 11990 and 11988 through the Agency NEPA procedures (Title 40 CFR, Part 6). Before undertaking an USEPA action, each program office must determine whether the action will be in or will affect a floodplain or wetlands. USEPA uses Flood Insurance Rate Maps and Flood Hazard Boundary Maps prepared by the Federal Insurance Administration (FIA) of the Federal Emergency Management Agency (FEMA). USEPA also consults National Wetlands Inventory Maps prepared by the Fish and Wildlife Service and consults with other appropriate agencies to determine whether a proposed action is located in or will likely affect a floodplain or wetlands.

The Chesapeake Bay Agreement of 1983

Recognizing the importance of reversing the long-term decline of the Chesapeake Bay, the Commonwealth of Virginia joined the USEPA, the States of Maryland and Pennsylvania, the District of Columbia, and other federal agencies in a joint effort. In December 1983, this effort was formalized as the Chesapeake Bay Agreement. The Agreement called for preparation and implementation of Bay-wide plans to improve and protect the integrity of the Bay.

The USEPA serves as central liaison for all federal participants in the Chesapeake Bay Agreement, including: the U.S. Fish and Wildlife

Service, NOAA, USCOE, U.S. Soil Conservation Service (SCS) and the U.S. Geological Survey (USGS). Each agency provides funds, research support and manpower for the Chesapeake Bay Agreement.

The Chesapeake Bay Agreement of 1987

This new agreement, drafted by the Chesapeake Executive Council and signed in December, 1987, contains technically up-to-date and specific restoration recommendations. The new agreement outlines the following goals and specific commitments for action in six sections:

1. Living Resources

Goal: To provide for the restoration and protection of living resources, their habitats, and ecological relationships.

Commitments: Adopt criteria for protection of water quality and habitat conditions and use these criteria to implement protection plans;

Adopt a baywide plan for assessment of species with commercial, recreational and ecological value by July 1988;

Adopt a schedule for development of fishery management plans by January 1989;

Protect and restore tidal and nontidal wetlands.

2. Water Quality

Goal: To reduce or control point and non-point sources of pollution to attain a water quality necessary to support the living resources of the Bay.

Commitments: Adopt and begin implementing a plan by July 1988 to achieve 40-percent reduction of nutrients entering the Bay by the year 2000.

Adopt an implementation plan by July 1988 for management and control of conventional pollutants.

The USEPA will develop and adopt a plan by July 1988 for control and reduction of point and non-point sources of nutrient, toxic, and conventional pollution from all federal agencies and installations.

Adopt an implementation plan by December 1988 for reduction and control of toxic materials from point and non-point sources and from bottom sediments.

Reevaluate the 40-percent nutrient reduction target by December 1991 based on results of modeling, research monitoring, and progress to date.

3. Population Growth and Development

Goal: To plan for and manage the adverse environmental effects of human population growth and development in the Chesapeake Bay system.

Commitments: Adopt development guidelines by July 1988 to reduce adverse impacts on water quality and living resources, and assist local governments in evaluating land use and development decisions.

Evaluate state and federal development projects in light of potential impacts on water quality and living resources.

Provide incentives, technical assistance and guidance to encourage local governments to incorporate protection of tidal and nontidal wetlands in their land use and water supply planning.

Report by July 1988 on anticipated population growth and land development patterns through 2020, infrastructure requirements for growth and development, environmental programs to improve Bay resources while accomodating growth, alternative means of managing and directing growth, and alternative mechanisms for financing governmental services and environmental controls.

4. Public Information, Education and Participation

Goals: To promote greater understanding among citizens about the Chesapeake Bay system, the problems facing it and policies and programs designed to help it.

Commitments: Conduct education programs to inform the public, local governments, industry and others of their roles, responsibilities and opportunities in the restoration and protection effort.

Provide for public review and comment on all implementation plans.

5. Public Access

Goal: To promote increased opportunities for public access to the Bay and its tributaries.

Commitments: Intensify efforts to improve and expand public access opportunities made available by the federal, state, and local governments.

6. Governance

Goal: To support and enhance a comprehensive, cooperative and coordinated approach toward management of the Chesapeake Bay system. To provide for continuity of management efforts and perpetuation of commitments necessary to ensure long-term results.

Commitments: Continue to support environmental monitoring and research to provide technical and scientific information necessary for management decisions.

Continue to support the Chesapeake Executive Council and associated advisory and support bodies.

The specific commitments of the 1987 Bay Agreement are backed by current research and are designed to create significant, efficient improvements in the Bay. For example, mathematical models of the Bay indicate that a 40-percent reduction in nutrient levels will lead to significant improvements in water quality so that oysters, striped bass larvae and other organisms will have a better chance to survive.

Meeting the commitments of the 1987 Bay Agreement will require major investments in pollution control programs such as sewage treatment plants, stormwater control structures and expanded control of toxics and agricultural pollution. Unfortunately, funding commitments are not specified.

The Agreement includes a provision for public review and comment on all implementation plans. During October, 1988, the Citizens Advisory Committee to the Chesapeake Bay Program will conduct roundtable public meetings to discuss the Agreement.

STATE LAW, PROGRAMS AND COORDINATING AGENCIES

Vegetated Wetlands Act of 1972 (Code of Virginia Title 62.1, Chapter 2.1)

This Act sets standards for the use of wetlands and adoption of ordinances; describes jurisdiction of wetland boards and makes the Marine Resources Commission (VMRC) responsible for reviewing board decisions, issuing permits, and developing guidelines. Available guidelines evaluate wetland values based on vegetative community structure.

The policy of the Act is as follows:

"Therefore, in order to protect the public interest, promote the public health, safety and the economic and general welfare of the Commonwealth, and to protect public and private property, wildlife, marine fisheries and the natural environment, it is declared to be the public policy of this Commonwealth to preserve the wetlands, and to prevent their despoliation and destruction and to accommodate necessary economic development in a manner consistent with wetlands preservation."

With the enactment of Chapter 300, Acts of Assembly, 1982, the General Assembly added nonvegetated intertidal areas (tidal mud or sand flats, beaches and oyster reefs) to the above wetlands protection law.

The Virginia Environmental Quality Act of 1972 (Code of Virginia, Section 10-178 et seq.)

This Act established the Virginia Council on the Environment (COE) as a state agency. The COE coordinates environmental policy by promoting the wise use of air, water, land and other natural

resources, and by protecting these resources from pollution, impairment or destruction. The Virginia Environmental Quality Act directs the COE

"...to initiate, implement, improve and coordinate the environmental plans, programs and functions of the State in order to promote the general welfare of the people of the Commonwealth and fulfill the state's responsibility as trustee of the environment for the present and future generations."

The COE has no regulatory authority but is responsible for assuring coordination among state environmental regulatory programs and helping disseminate grant monies. Agencies represented on the council operate under the auspices of the Secretaries of Natural Resources, Human Resources and Economic Development within the Department of Conservation and Historic Resources (DCHR). These agencies are the:

- State Air Pollution Control Board
- Commission of Game and Inland Fishes
- Department of Agriculture and Consumer Services
- Department of Conservation and Historic Resources
- Department of Health
- Marine Resources Commission
- State Water Control Board

In relation to Portsmouth's Coastal Zone Land Use Plan one of the COE's responsibilities under the CZMA is to administer Virginia's efforts in the Chesapeake Bay Initiatives Program (CBIP). The CBIP includes cooperative monitoring of water quality; setting standards for urban runoff treatment plants, chlorine reduction and toxics; financing sewage treatment plants; managing fisheries and commercial and recreational boating; and providing research and education.

The Virginia Coastal Resources Management Program

In response to the federal CZMA, the Commonwealth of Virginia developed the Virginia Coastal Resource Management Program (VCRMP). The Program received final approval from the Office of Ocean and Coastal Resource Management of NOAA in September 1986. The VCRMP proposes no new legislation or agencies; under COE coordination, it provides a framework for networking existing coastal resource management agencies.

The VCRMP makes the Commonwealth eligible for federal CZMA funds. The Program received one \$1,000,000 in 1987 and will probably receive a like sum each year for the next five years. The 1987 funds were allocated to regional planning districts, local governments and state agencies to assist in studying and managing coastal resources.

The central feature of the VCRMP is a core of eight regulatory programs that subject critical land and water uses to regulation by the Commonwealth. The core programs include:

1. Fisheries Management

Regulatory Authority Over Commercial and Recreational Fishing -- MRC and Commission of Game and Inland Fisheries (CGIF).

2. Subaqueous Lands Management

Regulatory Authority Over All Encroachments In, On, or Over State-Owned Subaqueous Lands -- MRC.

3. Wetlands Management

Regulatory Authority Over All Encroachments Into Vegetated and Nonvegetated Wetlands -- MRC.

4. Dunes Management

Regulatory Authority Over All Encroachments Into Coastal Primary Sand Dunes -- MRC.

5. Non-point Source Pollution Control

Regulatory Authority Over Erosion and Sedimentation From Nonagricultural Upland Land Disturbing Activities -- Department of Conservation and Historic Resources (DCHR).

6. Point Source Water Pollution Control

Regulatory Authority Over Existing, Planned or Potential Discharges to State Waters -- State Water Control Board (SWCB).

7. Shoreline Sanitation

Regulatory Authority Over Shoreline Use of Septic or Other On-Site Domestic Waste Systems -- State Department of Health (DOH).

8. Air Pollution Control

Regulatory Authority Over Emissions Affecting Air Quality -- State Air Pollution Control Board (SAPCB).

The VCRMP gives special attention to the management of Geographic Areas of Particular Concern (GAPCs) -- areas that contain particularly important resources or where natural conditions pose particular threats to man and his investments. Virginia's program identifies 11 categories of GAPC and describes the special management provided by the Program. The VCRMP also recommends priority land use options for each category.

Coastal Natural Resource Areas of Particular Concern

1. Wetlands

These are protected under the Virginia Wetlands Act by state or local regulation with MRC oversight. (See Core Regulatory Program)

2. Spawning, Nursery and Feeding Grounds

This category includes four areas:

- ° James River oyster seed beds
- ° Public oyster grounds
- ° Blue crab sanctuary
- ° Striped bass spawning sanctuaries

These are protected under special regulations of the Virginia Marine Resources Commission and state statutes.

3. Coastal Primary Sand Dunes

These are protected under Coastal Primary Sand Dune Protection Act (See Core Regulatory Program)

4. Barrier Islands

These are protected under a variety of state, federal and private conservation organizations.

5. Significant Wildlife Habitat Areas

These 10 areas are protected and managed as Wildlife Management Areas by CGIF.

6. Significant Public Recreation Areas

These 14 areas are owned and managed by Division of Parks and Recreation (DPR). Planning is carried out through the Virginia Outdoors Plan (VOP). Acquisition for new areas may be by condemnation.

7. Significant Mineral Resource Deposits

Extraction activities are regulated under Minerals Other Than Coal Surface Mining Law administered by Department of Conservation and Economic Development.

8. Underwater Historic Sites

Underwater historic property is under the specific statutory authority of the MRC. This category includes submerged shipwrecks and cargo and refuse sites or submerged sites of former habitation that are on state-owned subaqueous bottom and are determined valuable by the Virginia Historic Landmarks Commission.

Coastal Natural Hazard Areas of Particular Concern

9. Highly Erodible Areas

Shoreline Erosion Advisory Service (SEAS) gives technical assistance to private owners. The Shoreline Erosion Control Act gives financial assistance to local governments under Public Beach Conservation and Development Act.

10. Coastal High Hazard Areas

The Virginia Flood Damage Reduction Act encourages uniform statewide building codes and local zoning that restricts development areas.

Waterfront Development Areas

11. Coastal Zone Management (CZM) Funds

CZM funds are available to localities that ask for GAPC designation of waterfront areas if the localities develop special management programs for those areas.

Coordination and oversight of the VCRMP is handled at three separate levels of responsibility. Individual management activities, primarily the operation of Virginia's core regulatory programs, are independently managed by individual agencies. Management by these agencies is coordinated by the overview and direction of the Secretary of Natural Resources. The COE assists the Secretary by administering the details of the VCRMP and acting as "lead agency" for program and grant management, monitoring and reporting.

Governor's Executive Order No. 13
(June 23, 1986)

Through this Executive Order, Governor Gerald Baliles established the VCRMP and directed all state agencies to carry out their duties consistent with the VCRMP and in a manner that promotes overall agency coordination in achieving VCRMP goals and objectives. The Executive Order set out the 25 policy goals under the following headings:

- ° Prevention of Environmental Pollution and Protection of Public Health
- ° Prevention of Damage to Natural Resource Base
- ° Protection of Public and Private Investment
- ° Promotion of Resources Development
- ° Promotion of Public Recreation Opportunities
- ° Promotion of Efficient Government Operation
- ° Provision of Technical Assistance and Information

The order also outlined procedures to resolve conflicts at the state level.

Waters of State, Ports and Harbors
(Code of Virginia, Title 62.1)

The following chapters of Title 62.1 are pertinent (in addition to the Vegetated Wetlands Act of 1972 described previously):

- ° Chapter 1. -- Watercourses Generally

This chapter gives all ungranted beds of bays, rivers, creeks and shores to the Commonwealth. The MRC has the authority to approve permits to encroach on subaqueous beds (below mean low-water mark). The CGIF controls certain lands in order to protect them for fish and wildlife.

- ° Chapter 3.1 -- State Water Control Law

This chapter establishes the SWCB as the administering and rulemaking agency. The SWCB sets discharge enforcement regulations (as described in Articles 3-8 of the State Water Control Act) for industrial establishments, sewage treatment plants, pollution from boats, and discharge of oil into state waters. As part of its pollution control effort, the SWCB implements the National Pollution Discharge Elimination System (NPDES) permit program and controls the issuance of No-Discharge Certificates.

° Chapter 16 -- Wharves, Docks, Piers and Bulkheads

This chapter controls the erection and abatement of private piers, wharves, docks and landings. It does not control public works.

° Chapter 20 -- Miscellaneous Offenses

This chapter contains miscellaneous laws relating to water pollution. Laws included cover disposal of solid waste into, and obstruction of, rivers, creeks, streams or wetlands. Section 62.1-195 controls discharge of oil into navigable tidal waters of the state.

Virginia Erosion and Sediment Control Law of 1973
(Code of Virginia, Title 21, Chapter 1, Article 6.1)

This law was enacted to control the soil erosion to prevent sedimentation, turbidity and pollutant problems in state waters. The statewide erosion and sediment control program is administered by the Soil and Water Conservation Commission (SWCC) within DCHR. The SWCB participates as an advisor. This law provides that no one may engage in any land-disturbing activity (other than agriculture) without an Erosion and Sediment Control Plan approved by the local authority. The Plan must meet local conservation standards. The Law also requires periodic inspections of land-disturbing activities to ensure compliance.

Virginia Outdoors Plan of 1984

The DPR, within the DCHR, primarily manages this plan. Coastal recreational access could be funded through the Virginia Outdoor Fund or the Open Space Land Act (Code of Virginia, Title 10, Chapters 151-158). The governor endorses the VOP as the State Comprehensive Outdoor Recreation Plan (SCORP). The Plan meets National Park Service, Department of the Interior approval, as the plan qualifying Virginia for receipt of matching grants for acquisition and development. These grants are available under the Land and Water Conservation Act, which provides the funds for implementing the VOP.

REGIONAL AUTHORITIES

The Southeastern Virginia Planning District Commission

The Southeastern Virginia Planning District Commission (SVPDC) is a regional planning agency authorized by the Virginia Area Development Act of 1968 (VADA) and created by Charter Agreement in 1969 as one of 22 State Planning District Commissions. It represents the cities of

Portsmouth, Chesapeake, Franklin, Norfolk, Suffolk and Virginia Beach, and the Counties of Isle of Wright and Southampton. The primary function of the SVPDC is to promote the orderly and efficient physical, social and economic development of the district. SVPDC's involvement in physical planning most directly affects the implementation of the recommendations of this plan. The SVPDC studies, develops plans for and advises local governments in land use development, water quality, water resources, coastal zone management and open space/recreation development.

Hampton Roads Water Quality Agency

The Hampton Roads Water Quality Agency (HRWQA) is a consortium of the Hampton Roads Sanitation District, Peninsula Planning District Commission and SVPDC. The Agency was formed in 1974 to develop an areawide waste treatment management plan in accordance with the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500, Section 208). The Governor designated the HRWQA as a Section 208 planning agency on April 30, 1974. The HRWQA has responsibility for water quality management planning for the entire area of the SVPDC and the Peninsula Planning District Commission. The major aims of the HRWQA are:

- ° Consistency with the requirements of Section 208 of the Clean Water Act;
- ° Satisfaction of federal water quality planning guidance and regulations; and
- ° Meeting the water quality needs of the Hampton Roads area.

The Lower James-Hampton Roads River Basin Committee

This is one of eight citizen-advisory committees created in 1985 to provide public participation in Virginia's Chesapeake Bay Program, this committee lets Portsmouth citizens review Virginia's Chesapeake Bay initiatives and other state programs related to the southern Chesapeake Bay. The committee is expected to recommend changes to state plans and programs designed to benefit the Bay for the 1988-90 biennium.

LOCAL ADMINISTRATION

Wetlands Board

A local wetlands board was established by ordinance on April 26, 1988. The VMRC previously administered all permit review.

Virginia Coastal Resources Management Program

VCRMP has a local coordinator who manages monies and grant-related activities in Portsmouth.

State Comprehensive Outdoor Recreation Plan

The Director of Parks and Recreation is Portsmouth's local coordinator for SCORP.

Erosion and Sediment Erosion Control Program

The City Engineer is Portsmouth's program coordinator for the DCHR program.

Southeastern Virginia Planning District Commission

The City Manager is the executive commission member representing Portsmouth.

Lower James-Hampton Roads River Basin Committee

The City has one seat on this citizen's advisory committee.

Other Groups

A number of local interest groups and private individuals have become involved in public participation related to shoreline use. These groups vary, depending on the proposed project. Examples are: The Scotts Creek Committee and the Craney Island Commission.

III. COASTAL ZONE LAND USE PURPOSE

The purpose of a local CZLU Plan is to provide policy for five basic areas: Natural Resource Protection, Land Use Management, Pollution Control and Protection of Public Health, Recreation and Open Space Conservation, and Economic Development.

1. Natural Resource Protection

A natural resource protection policy will recognize the increasing demand for shore-related development in the context of the increasing need to conserve dwindling coastal resources for the valuable services they perform. A primary goal of Portsmouth's CZLU Plan is to preserve remaining marshes and marine habitats in the estuaries.

A workable CZLU Plan will permit continued water-dependent development along the shoreline, leave wetlands and associated buffer areas undisturbed and minimize damage to the diversity and productivity of marine resources (subaqueous lands, submerged aquatic vegetation, finfish and shellfish).

2. Land Use Management

A land use management policy will provide for the safe and efficient use of land while protecting the quality of the surrounding environment. The CZLU Plan will ensure that future growth and development will protect Portsmouth's coastal resources in an environmentally sound manner.

The CZLU Plan will provide the City with a framework for coordinating, controlling and promoting a variety of land uses along the coastline. The CZLU Plan will also give the City the ability to address the land use impacts of development on the surrounding coastal area and a basis for future land use decisions.

3. Pollution Control and Protection of Public Health

A pollution control policy will establish development, zoning and land management practices that will allow greater access to and use of coastal resources without significantly detracting from usefulness, enjoyment and safety of those same resources.

The CZLU Plan will provide strategies to protect water quality, control erosion and sedimentation and generally reduce point and non-point source pollution. Effective site selection criteria will divert future point or non-point source pollution to locations that will minimize negative impacts to coastal resources and human health.

4. Recreation and Open Space Conservation

The recreation and open space conservation policy will give the city an evaluation of locations in the city for shoreline access for water-related activities. The CZLU Plan will evaluate the potential for creating access to the coastline through boat ramps or parkland.

The CZLU Plan will ensure adequate conservation of existing open space, including environmentally sensitive areas.

5. Economic Development

An economic development policy will give the City a guidebook to promote future industrial and commercial development along the coastline in an environmentally compatible matter. The CZLU Plan will identify appropriate waterfront and key sites for development that will not adversely affect water quality, natural habitat coastline stability or commercial aquatic resources. The CZLU Plan will also identify sites that take into account the carrying capacity for general land use.

IV. SYNTHESIS OF EXISTING PLANS AND STUDIES

Much planning has already been undertaken and many reports and studies are already prepared containing baseline information relevant to the CZLU Plan. This section summarizes many of these reports and studies and examines their implications for the CZLU Plan.

Portsmouth Comprehensive Plan Part 3 Plans for Action (1980)

This plan was written by the City of Portsmouth Planning Department. This plan, which is being updated, makes recommendations for the coastal areas of Portsmouth.

The plan divides the City into 21 neighborhoods, of which nine (Downtown, Northside, Westhaven, Park Manor, Sterling Point, Hatton Point, Merrifields, Port Norfolk and Waterview) have coastlines.

Downtown

The plan recommends the careful completion of downtown waterfront development, in the spirit of the waterfront development plans, to ensure that the full potential of the waterfront is realized and that public and private amenities are enhanced.

Northside

The plan recommends fuller use of the Scott's Creek Waterfront through the development of a public boat ramp, rezoning of the Flagship Restaurant property and the resolution of severe drainage problems in the creek.

Westhaven

The plan does not make any recommendations for the waterfront.

Park Manor

The plan does not make any recommendations for the waterfront.

Sterling Point

The plan does not make any recommendations for the waterfront.

Hatton Point

The plan considers the future uses of the Wise Beach property and the waterfront property near Peace Way/Midfield Parkway most important.

Merrifields

The plan considers the future use of the Southampton/Ballard and Long Point PUD sites most important. Both sites have creek frontage, but wetlands at both sites cannot be developed.

In addition to land use recommendations, the plan also makes recommendations regarding economic development and recreational opportunities.

Economic Development

The plan states that marketable industrial sites could be developed in three areas: at West Norfolk, Newtown and Craney Island with deepwater access. In West Norfolk, the Beasley Farm and other areas offer sites with both rail access and water frontage that would be attractive to satellite firms of petro-chemical companies. In Newtown, the old Coast Guard base provides the best opportunity for attracting a capital-intensive industry. The base has deepwater access and 40 acres of back-up land. Craney Island offers the prospect of developing major port-industrial operations. This potential development, however, is years away. A fourth area, Pinnars Point, provides the best opportunity to attract port-related light industry and distribution facilities.

Recreational Development

The plan specifically recommends improving the waterfront access by constructing new boat-launching ramps at Scott's Creek and at the Western Freeway Bridge in West Norfolk, developing a major waterfront park with boating facilities on the east side of Craney Island and by ensuring that future downtown waterfront developments preserve public access to the seawall and visual continuity between High Street and the river.

Comprehensive Elizabeth River Water Quality Management Plan (1986)

This plan, written by the HRWQA and the SVPDC, examined water quality goals in relation to waterfront development goals and discovered that a number of the waterfront development goals potentially conflict with the achievement of water quality goals. Specifically, goals that promote industrial and port-related development and higher density residential and commercial development may increase economic development. However, the associated increases in urban runoff and non-point source pollution loads to adjacent waters conflict with water quality goals.

The plan identified seven "transitional parcels of concern" in Portsmouth. These areas are projected to undergo a change in land use that could affect water quality in the Elizabeth River Basin. These parcels are:

Craney Island Disposal Area

This is currently a disposal area for dredged material. The future use is projected to combine the current use with industrial use.

Cox Site

This land is currently vacant. The projected use is industrial development.

Beasley Property

This land is currently vacant. The projected use is mixed-use development.

Pinners Point

This is currently a sewage treatment plant. The future use is unknown.

Scotts Creek

This is partly vacant and partly used for mixed-use development. The projected future use is industrial development, specifically harbor service. A recent proposal to dredge the creek to accommodate larger-draft boats has caused substantial discussion within the surrounding neighborhood. A separate study (described below) has been commissioned by the City to examine development potentials in the area relative to dredging impacts.

Allied

The current and future use is industrial development.

Port Centre

The land is vacant. The projected use is commercial development.

Scott's Creek Project Technical Memorandum (1987)

This report, prepared by Hunter Interests, Inc., analyzes market potential for future uses and prepares a conceptual development plan for the Scott's Creek area. The report focuses on 37 acres of vacant land on the north shore of Scott's Creek. The report not only analyzes the existing market, but also makes recommendations regarding the future use of the north shore area.

Industrial Markets

The report indicated that waterfront industrial demand on the Elizabeth River and in Portsmouth specifically is characterized by certain changes and shifts, but little overall growth. Existing industrial waterfront areas were not experiencing any dislocation pressure to change waterfront land uses to commercial or residential development. Rather, industrial service and support establishments requiring waterfront locations showed growth desires and the need for new locations. Good industrial growth was forecast for maritime service establishments over the short-term. Over the long-term, however, the future of these industries was uncertain.

Commercial Markets

The report stated that commercial development potentials at Scott's Creek were severely limited by location, access and market conditions. The location of the port industrial environment on the north coast cancels out many otherwise attractive aspects of the waterfront. Lack of access is a serious limitation to site development. Any mixed use development potential depends on the resolution of the access problem. A highway interchange planned for the area is still in the design phase. The market conditions rule out any office development in an already over-built environment and, while a long-term commercial use of the north shore land is clearly the highest and best use, such a development will not be feasible for at least 10 years. Small amounts of commercial, recreation, retailing, wholesaling and boat-related office and services uses, however, could be realized on the north shore in the short-term.

Residential Markets

The report stated that there appears to be a strong market for waterfront residential development, and the authors were optimistic about potentials for luxury waterfront residential developments in Portsmouth. They felt, however, that sites other than Scott's Creek were more desirable for future waterfront development projects for the short and medium-term future. A small residential development linked with a boat service center, a large marina and retail and

commercial support could, however, be successful on the North Shore. There were no development potentials for a hotel/motel at Scott's Creek over the short-term and only marginal prospects for such a development over the medium-term.

Other Markets

The report found that the Hampton Roads area has no single pleasure boating center or focus of activity in the local pleasure craft industry. However, the area has several marinas. Still, the authors felt that a true opportunity exists for providing a diversified marina service center to service the existing market. The authors also pointed out that Scott's Creek has several locational disadvantages. One disadvantage is its time-distance relationship to the Chesapeake Bay. That is, most boat owners would rather drive their automobile one or two hours to a boat anchor in the Chesapeake Bay rather than cruise several hours in their boat to reach the same location. Other disadvantages included high levels of commercial traffic, the overall industrial environment and the somewhat un hospitable shorelines of the Elizabeth River.

Recommendations

The report recommended that the north shore be developed as a "marine industrial park" that would include maritime uses such as establishments supporting deep craft vessels and commercial barges; marine industrial establishments such as boat service and repair establishments; engine maintenance and repair establishments; hull repair establishments; sail lofts; electronic sales and service establishments; and boat yards and related establishments. The authors also recommended dredging a deep water commercial channel from the Elizabeth River with a narrower and shallower channel to the new establishments along the north shore. Additional dredging could be done at the individual property owners' discretion.

Shoreline Situation Report **Cities of Chesapeake, Norfolk and Portsmouth (1976)**

This report was prepared by the Virginia Institute of Marine Science (VIMS). Its objective was to assess important shoreline parameters to help planners and shoreline managers make the best decisions for utilization of limited and valuable coastal resources. VIMS inventoried and mapped coastal land ownership, shoreland types, nearshore width (from shore to 12-foot depth based on mean low-water elevation datum), floodplains, waste dischargers and federal lands.

General

Much of Portsmouth's southeastern shore is federally owned. The highest probable flood (standard project tidal flood) extends more than a mile inland along Portsmouth's eastern coasts. Sixty-six percent of Portsmouth's shoreline is natural or semi-natural (marshland); 30 percent is bulkheaded; and two percent is beach.

Shore Use Limitation

Many areas are already completely used. Conflicting land use patterns could easily arise. Industry and commercial uses requiring deep-water docking are limited to land areas abutting the Main Stem, Southern Branch and Western Branch of the Elizabeth River. Recreational potential is currently limited because of poor water quality and the demand for residential development. Construction on shore lands is subject to flood damage since the 100-year storm would rise up to nine feet and more frequent floods would still be significant.

Alternate Shore Uses

A major use of unused shorelands should be a comprehensive effort to save areas with marshes or other peculiar natural resources. This could be accomplished by creating a series of open-space parks along the shoreline. In a metropolitan area such as the tri-cities, a major effort should be given to the creation and maintenance of open space. These areas would not only conserve the quality of the shorelands but also improve the quality of life for the residents.

The Elizabeth River **An Environmental Perspective (1983)**

This report was funded by the Chesapeake Bay Program and prepared by the Virginia State Water Control Board and the Bureau of Surveillance and Field Studies. The report examined water quality and water resources data and summarized the present environmental conditions in the Elizabeth River system. In addition, the report assessed trends in some of the measured parameters over the span of available information.

Available Information

The most significant problems in the Elizabeth River system are elevated levels of organics (primarily polynuclear aromatic hydrocarbons [PNA's]) and metals in the bed sediments and the associated toxicity or potential for toxicity in these areas of the river. The history of extensive dredging in the Elizabeth River and the continuing removal of large volumes of sediment further complicate the situation.

Particular Problem Areas

Sediments in the portion of the Southern Branch of the Elizabeth River between St. Julian's Creek and the Downtown Portsmouth Tunnel exhibit some toxicity, according to bioassays conducted by Old Dominion University (ODU) and the EPA. The Virginia Institute of Marine Science (VIMS) found extremely high levels of PNAs in sediment from the area just north of St. Julian's Creek in the vicinity of two creosoting plants (one of which is no longer operating). Preliminary biological studies by VIMS have confirmed toxic responses by species in the Elizabeth River, particularly in the area contaminated most heavily by PNA's. Toxicity appears to be directly related to contact with the contaminated sediments.

Historical Trend

Historical trends indicate that water quality may have improved somewhat since the 1960's. Populations of indigenous estuarine fish species continue to inhabit and survive in this area.

Hampton Roads Water Quality Management Plan 1983 Implementation Status and Plan Update

The Hampton Roads Water Quality Management Plan (HRWQMP) was prepared by the SVPDC for the HRWQA with funds from the EPA. The HRWQMP for 1983 reports the status of HRWQMP implementation activities since 1981. The HRWQMP also reports on plans made since the initial HRWQMP was issued in 1978. The report focuses on the planning process toward non-point source evaluation and control strategies and reiterates the need for cooperative and comprehensive water quality planning for the Hampton Roads area.

General Water Quality Recommendations

The HRWQA developed General Water Quality Management Recommendations, which focus on changes in resource management policies and regulatory procedures. Many of the recommendations have state and national significance. The report indicates that the General Water Quality Management Recommendations were generally sound and well-conceived. Considerable implementation has occurred. Most of the Recommendations remain valid today and, with only few modifications, all are reiterated in the Hampton Roads Water Quality Improvement Program.

Basin Plan Recommendations

The HRWQMP listed the area's principle water bodies in two categories, according to the severity of their water quality problems.

The HRWQMP limited its parameter-specific control recommendations to the parameters addressed in the HRWQA water quality sampling and modeling programs. The report documents individual Basin Plan recommendations and the actions taken over the last five years to implement them. Finally, the report states that the most pressing need for Basin Plan development involves the Elizabeth River Basin. The report indicates which recommendations need to be modified to meet the particular problems of the Elizabeth River.

Management Agency Designations

The HRWQMP assigned implementation responsibilities to several agencies and recommended a specific institutional structure for ongoing water quality management in the Hampton Roads area.

Five years' experience with the HRWQMP Management Agency designations confirmed their validity. The management agencies directly and indirectly accomplished many of the HRWQMP recommendations.

Plan Update

Since the HRWQMP was completed, certified and approved, water quality management has made significant progress in the Hampton Roads area. Several HRWQMP recommendations have been, or are being, achieved. However, some recommendations have not been achieved, and several new issues have arisen.

The Plan Update is presented in a series of Tables as the Hampton Roads Water Quality Improvement Program. It describes the Areawide Activities that will guide water quality management efforts between 1984 and 2000. It details the Basin-specific Point Source Control Strategy and summarizes the Non-point Source Control Strategy. The Improvement Program also includes specific assignments of implementation responsibility. The Basin-specific aspects of the Non-point Source Control Strategy are described in detail in the companion report, Non-point Source Control Program for the Hampton Roads Area.

Non-point Source Control Program for the Hampton Roads Area (1983)

Prepared by the SVPDC, this report describes and refines the non-point source control recommendations contained in the HRWQMP and the subsequent Preliminary Recommended Implementation Program for Non-point Source Control. This Program also offers basin-specific recommendations.

Non-point Source Control Program

The program initially defined problems, based on an extensive sampling and modeling program. The population and employment forecasts were considered to identify probable future pollution contribution sources.

Urban control recommendations center on:

- ° Implementation of Erosion and Sediment Control Ordinance requirements
- ° Implementation of local government urban housekeeping-type activities
- ° Ongoing public education and information programs

Agricultural recommendations include:

- ° Implementation Agreements with the area's four Soil and Water Conservation Districts
- ° Cooperation with and participation in other agency's agricultural non-point control programs
- ° Participation in and sponsorship of public education and information programs

Other miscellaneous recommendations relate to:

- ° Animal Wastes -- No Discharge Certificate Program
- ° Agricultural Recycling of Wastewater Treatment Plant Residual Solids -- No Discharge Certificate Program
- ° Landfills -- State Health Department Solid Waste Disposal Regulations
- ° Construction Activities -- Erosion and Sediment Control Program
- ° Septic Tanks -- State Health Department Sewage Handling and Disposal Regulations
- ° Outside Materials Storage -- Best Management Practice Handbooks
- ° Drydocks -- Studies underway
- ° Marinas -- State and federal regulations studies

Monitoring Program

The report suggests that an effective planning and implementation effort requires an ongoing monitoring program. It recommends that the HRWQA should continue its leadership role in monitoring non-point source pollution and Best Management Practice effectiveness. It also recommends several water quality studies as well as routine water quality, controls implementation and socio-economic trend monitoring efforts. The report envisions comprehensive water quality management plans.

Basin-Specific Non-point Source Control Program

The Basin-Specific Non-point Source Control Program describes recommended non-point source control activities that are generally applicable throughout all the basin(s). It also includes assignments of implementation responsibility for each program activity. The HRWQA has concluded that individual control measures are best determined on a site-specific basis. Thus, the Basin-Specific Program does not include site-specific recommendations for controls such as Best Management Practices implementation or housekeeping activities. It should serve as a guide to site-specific controls implementation. The Simplified Technique for Developing Site Specific Non-point Source Control Plans, described in a companion report, will assist in making that transition from basin-level guidance to site-specific implementation.

Background and Problem Assessment Report for the Elizabeth River (1984)

This basin-specific assessment was prepared by the Virginia State Water Control Board in cooperation with the HRWQA and SVPDC.

Problem Areas

Some of the key water quality issues related to the Elizabeth River were highlighted. These were:

- ° Dissolved oxygen violations during summer months
- ° Toxic organics in sediments
- ° Heavy metals accumulations in sediments
- ° Stressed fisheries and biological organisms
- ° Prohibition on shellfishing
- ° Poor flushing characteristics
- ° Sediment build-up resulting in increased dredging frequency

The report suggests that the reasons for the above problems are varied and complex. A major issue is how to maintain a good level of aesthetics for a river that serves as a major marine transportation corridor and receives millions of gallons of wastewater each day.

Review of Issues

- ° The report assesses the applicability of existing water quality standards to the Elizabeth River and concludes that dissolved oxygen standards may not reflect the river's natural condition. Conversely, heavy metal standards may need to be tighter for the Elizabeth River.

- ° The "fishable/swimmable" goal is deemed reachable in time on the Elizabeth River. However, the costs may be high and might include not only direct users but also all citizens of municipalities involved.
- ° The "Urban Use Segment" may be a tool to reduce total costs of improved water quality. Dollar for dollar, results could be least in the southern branch. However, only EPA can grant waivers to the City of Portsmouth. Additional studies of the Elizabeth River may indicate a need for upgrading of nutrient removal and other parameters.
- ° Since the Chesapeake Bay Study targeted the Elizabeth River as one of the major toxic sources of the lower bay, the toxic problem deserves more focused study. The location of sources is key because most can be well controlled, once identified. After sources are under control, efforts can focus on existing toxic sediments and whether to dredge them or let them remain in the river to degrade naturally.
- ° Best Management Practices may not work unless they become mandatory, regulated and administered by state and federal agencies. This would be expensive so equitable funding alternatives and cost-benefit for improving water quality would have to be identified.
- ° The issue of dredge spoil removal as an impact on water quality is closely tied to toxics. If toxics are controlled, necessary dredging drops out as a major water quality issue.
- ° Compatible uses of the river relies on coexistence of existing uses that are traditionally non-compatible (recreation and industry). Minimization of aesthetic pollution would encourage greater use and enjoyment of the river.

Conclusion

The report recommended and outlined a study very similar to the Comprehensive Elizabeth River Water Quality Management Plan that has been previously described and was produced two years subsequent to this report.

Open Space -- 2000 (1985)

This plan was written by City of Portsmouth staff. It examined the existing open space and recreational facilities within the City and made recommendations to improve these facilities. Of importance to the Coastal Land Use Plan any recommendations involving improving public boat access and development of waterfront recreational areas.

Currently, the only public boat ramp within the City is in City Park. At the time of the study, this ramp was being expanded to increase the ramp size to four lanes. If one boat ramp lane serves 12,500 people, then Portsmouth needs approximately eight boat ramp lanes to serve its populace. Therefore, the plan recommended four additional boat ramp lanes in the short-term and an additional boat ramp in the long-term future.

The plan suggested that boat ramps be constructed on Scott's Creek and near the West Norfolk Bridge in the short-term and on Paradise Creek in the long-term. The plan also recommended development of a water-oriented park along with the boat ramp at Scott's Creek and a water access park at Bayview Boulevard.

Southeastern Virginia Recreation Facilities Inventory (1987)

This report, written by the Southeastern Virginia Planning District Commission, was a physical inventory of all recreational facilities in the southeastern Virginia region. Of importance to this Study were the number of boat ramps, number of marina slips, linear feet of public beach and linear feet of public fishing piers.

The Inventory listed five public boat ramp lanes at two sites. (One site is at the City Park; the other is unknown.) The Portsmouth Yacht Club has a sixth, private boat ramp. These six boat ramp lanes rank Portsmouth at the bottom of the list of municipalities providing boat access.

Boat Ramp Lanes in Portsmouth and Nearby Municipalities

<u>Municipality</u>	<u>Public</u>	<u>Private</u>	<u>Total Lanes</u>
Virginia Beach	28	23	51
Norfolk	13	10	23
Suffolk	21	0	21
Chesapeake	4	5	9
Portsmouth	5	1	6
TOTAL			110

The Inventory estimated that 15,000 trailored boats (not including boats registered outside the area) in southeast Virginia must compete for the region's 110 boat access lanes. This problem is expected to worsen, given the scarcity of suitable publicly-owned land and the estimated three percent annual increase in boat registrations.

The Inventory reported 537 boat slips in Portsmouth, distributed among the six private marinas.

Portsmouth Boat Slips

<u>Marina Name</u>	<u>Number of Slips</u>
Tidewater Yacht Agency	340
Lee's Yacht Center	95
VA Boat & Yacht Services	56
Pritchard RR Marina	24
Portsmouth Yacht Club	19
Harbor Tours	<u>3</u>
TOTAL	537

The Inventory also reported that the 86 miles of coastline in Portsmouth has only 200 feet of public beach and 40 linear feet of public fishing piers.

Downtown Portsmouth Parking Study (1985)

This Study, prepared by the Southeastern Virginia Planning District Commission, examined parking in downtown Portsmouth, including areas along the waterfront.

The Study reported 2,265 parking spaces along the waterfront. This represents 44 percent of the total downtown spaces. Of these 2,265 parking spaces, only 1,045, or 46.1 percent, are needed at peak hour demand creating a surplus of 1,220 parking spaces.

1987 SVPDC Economic Outlook

This Outlook written by the Southeastern Virginia Planning District Commission in July, 1987, provides a variety of social and economic characteristics for the southeast Virginia area, including Portsmouth.

The Outlook reported that the entire Hampton Roads economy has grown between 1980 and 1985. Sales have increased, and unemployment has decreased. However, a slowdown is expected. The reason: The federal government is gradually ending the large peacetime, military build-up; and the Hampton Roads area includes over 200,000 military and civilian employees of the federal government. The Outlook estimates that the Gross Regional Product of the region increased by 2.75 percent annually between 1965 and 1984. During those same years, the United States' gross national product increased by only 2.51 percent annually.

The Outlook indicated that general cargo tonnage at the Portsmouth Marine Terminal increased steadily between 1984 and 1986. In 1984, the Portsmouth Marine Terminal processed 0.95 million tons of cargo; in 1985, 1.09 million tons; and in 1986, 1.32 million tons. This represents a 38.9 percent increase over the two-year period.

The Outlook also reported increased tourism and conventions in the area. In Portsmouth, the number of conventions increased from 42 in 1985 to 78 in 1986. The number of convention attendees also increased during this time from 6,300 to 28,527.

Hampton Roads Office Study (1987)

This Study, written by the Southeastern Virginia Planning District Commission, examined trends in office building construction including vacancy rates, office demand and new office construction projects.

The Study predicted that Portsmouth will receive another 203,000 square feet of office space in 1987 and 1988.

New Office Space Predicted for 1987 and 1988

<u>Project Name</u>	<u>Square Footage</u>
Bristol Square	15,000
Crawford Executive Center	14,000
Kings Crossing	20,000
Port Centre Commercial Park	119,000
Portsmouth Parkside Development Association	<u>35,500</u>
Total	203,000

However, the study estimated a demand for only 20,000 additional square feet in 1987 and 1988. The vacancy rate of the existing 1,400,000 square feet of office space in Portsmouth was 17.8 percent in January, 1987. Thus 249,200 square feet of office space was vacant. The vacancy rate is likely to rise with the addition of 183,000 square feet of new, surplus office space.

Hampton Roads Income Trends and Analysis (1987)

This Analysis, written by the Southeastern Virginia Planning District Commission, examined various income trends in the Hampton Roads area. The Analysis indicated that all the income indicators had risen For Portsmouth. Total personal income, per capita personal income, median family income and median household income all showed steady growth throughout the 1980's. The Analysis also indicated a three-percent increase in the growth of military earnings as a percent of total earnings in Portsmouth. In 1984, military income represented 10.4 percent of total earnings.

V. GOALS FOR THIS PLAN

The goals of this Land Use Plan are consistent with the goals the Commonwealth of Virginia used as a basis for its coastal resources policy. These goals are inter-related with the policies listed previously in the CZLU Basis section and with the goals of the Virginia Coastal Zone Management Plan.

The pertinent goals of the Virginia Coastal Zone Management Plan are:

- ° To maintain, protect and improve the quality of coastal waters suitable for the propagation of aquatic life and recreation such as swimming.
- ° To reduce nonpoint pollution caused by inappropriate land uses and inadequate land management practices in tidal streams, estuaries, embayments and coastal waters.
- ° To reduce the potential for damage to coastal resources from toxic and other hazardous materials through effective site selection and planning as well as improved containment and clean-up programs.
- ° To protect the public health from contaminated seafood.
- ° To protect ecologically significant tidal marshes from despoliation and destruction.
- ° To minimize damage to the productivity and diversity of the marine environment from alteration of subaqueous lands and aquatic vegetation, and from the disruption of population balances of finfish and shellfish.
- ° To reduce the adverse effects of sedimentation on productive marine systems.
- ° To maintain areas of wildlife habitat and to preserve endangered species of fish and wildlife.
- ° To reduce or prevent losses of property, tax base and public facilities caused by shoreline erosion.
- ° To minimize dangers to life and property from coastal flooding and storms.
- ° To promote the wise use of coastal resources for the economic benefit and employment of the citizens of the Commonwealth.

- ° To protect and maintain existing uses of estuarine waters for shellfish propagation and marketing.
- ° To encourage provision of commercial and industrial access to coastal waters where essential to economic vitality.
- ° To maintain or improve productive fisheries.
- ° To provide for mineral-resource extraction in a manner consistent with proper environmental practices.
- ° To provide and increase public access to coastal waters and shorefront lands for recreation.
- ° To coordinate the Commonwealth's planning processes to facilitate consideration of alternative locations for major projects within the context of long-term development patterns and implications.
- ° To provide Portsmouth governing officials and private citizens with the technical advice they need to make wise decisions regarding uses of and impacts on coastal resources.

The particular goals of the Portsmouth Coastal Zone Land Use Plan, drawn from the goals listed above, are proposed as follows:

- ° To promote environmentally sound growth that allows both an increase in the quality of natural coastal resources and greater human use of those same resources.
- ° To identify the potential for increased shoreline access along Portsmouth's coastline.
- ° To protect coastal wetlands and evaluate the potential for wetland restoration.
- ° To formulate strategies that will most efficiently improve the Elizabeth River water quality.
- ° To provide general land use carrying-capacity recommendations to help accommodate all types of shoreline development along Portsmouth's shores.

CHAPTER 2 ANALYSIS OF EXISTING CONDITIONS

This chapter builds on the information presented in Chapter 1, reviews the results of the existing conditions analysis and summarizes the problems and opportunities in the study area. The information for this phase was compiled from published sources of past or present conditions, information supplied by the City of Portsmouth and State agencies, existing base maps and aerial photography and from a parcel-by-parcel land use inventory and field observation of environmental/ecological conditions conducted between January 11 and 15, 1988.

I. ENVIRONMENTAL AND ECOLOGICAL ANALYSIS

GENERAL LAND FORM

The study area lies completely within the geological Coastal Plain Province, the low-lying area between the fall line of direct coastal drainage and the Atlantic Ocean. The topography is nearly level. Upland areas generally exhibit less than two-percent slopes with a few low ridges exhibiting two- to eight-percent slopes. Elevations range from 10 to 15 feet above mean sea level (MSL) on upland portions of Portsmouth. Filled land occasionally reaches 20 to 25 feet above MSL. The banks of watercourses are gradual and exhibit slopes of five- to 10-percent, but many areas of sharper fall have been created by past fill. Submerged lands (below mean low water elevations) drop off gradually except where dredged.

The predominant natural landscape feature is the Elizabeth River and its tributaries. These watercourses define much of Portsmouth's boundaries. The main channel and the Southern Branch form Portsmouth's eastern boundary; the Western Branch separates old Portsmouth from the northern neighborhoods; and the James River forms the boundary of Craney Island/Rivershore. The low-lying topography accounts for the slow flow and the strong tidal influence characteristic of the Elizabeth River. This topography also accounts for the many meandering tidal creeks that extend inland.

SOILS

Much of the land adjacent Portsmouth's coastline is urban-made land (fill). Areas of original soil mostly contain soils in the Tidal Marsh and Mixed Alluvial Land soil association. These soils occupy

narrow strips along creek headwaters and consist of mixed materials deposited by runoff and tidal action. These soils become more expansive further downstream and may extend nearly a quarter of a mile inland along the Elizabeth River. Tidal flats and some beaches are primarily located along the Main Stem of the Elizabeth River and the south side of the Western Branch.

Soils of the Woodstown-Sassafras-Dragston soil association dominate the shorelands along the Western Branch of the Elizabeth River from Elizabeth Manor Country Club to Tareyton Lane (West of City Park) and occur in other areas directly upland of the Tidal Marsh and Mixed Alluvial Land soil association. Narrow strips of Tidal Marsh and Mixed Alluvial Land soils extend from the Western Branch and its estuaries for short distances into Woodstown-Sassafras-Dragston soils.

Table 2-1 describes the soil series most prevalent along Portsmouth's shoreline in the associations described above. Properties of these soils produce construction constraints in the coastal zone ranging from moderate to severe. Whenever these soils are sloped, erosion control is necessary when carrying out land-disturbing and revegetation activities. Tidal Marsh and Mixed Alluvial Land soils carry high risks for roadbed subsidence, have high water tables, are prone to flooding and are best suited for water-dependent recreational or wildlife habitat uses. Woodstown-Sassafras-Dragston soils are loamy, fine, course-textured, porous and highly permeable (requiring impounded retention basins). These soils are poor to fair as unimproved road bases.

The specific soil series within associations are not mapped because so many areas are filled. When considering construction on undisturbed sites, individual soils can be located on the Norfolk County Soil Survey.

HYDROLOGY

Annual rainfall in Portsmouth ranges between 45 and 50 inches per year. Surface drainage before Portsmouth was developed was not well-defined. Water pooled in several inland swamps, and surface water slowly moved cross-country to the Elizabeth River drainage. Today, urbanized land coverage in Portsmouth confines surface water to a network of stormwater drains, ditches and drainage tiles directed toward the Elizabeth River or its tidal creek tributaries. Only a few areas retain water or have completely unimpeded flow within stream banks.

The Elizabeth River system, an estuary in the James River Basin, gets its major freshwater flow from Deep Creek in the headwaters of the Southern Branch. The river eventually drains approximately 300

TABLE 2-1
Portsmouth Coastal Zone Land Use Plan
Soils Series Prominent Along Portsmouth Coastal
Areas and Properties Pertinent to Construction

Optimum Fill						
	Depth to Water Table (Feet)	above Water Table (Feet)	Shrink-Swell Potential	Workability When Wet	Suitability for Foundation or Road Base	Erosion- Subsidence Hazard
<u>Tidal Marsh Mixed Alluvial Land</u>						
Tidal Marsh	0.0	>5.0 _a	Low to Moderate	Not Suitable	Not Suitable	Moderate to Severe
Coastal Beach	0.0	1.0	None	Good	Not Suitable	Slight to Severe
Mixed Alluvial Land (Floodplains)	0.0	2.0-3.0	Low to Moderate	Not Adopted	Not Suitable	Moderate to Severe
<u>Woodstown-Dragston-Sassafras</u>						
Sassafras Loamy Fine Sand	2.0-3.0	<1.0 _b	None to Moderate	Fair to Good	Poor to Fair	Moderate to Severe
Woodstown Fine Sandy Loam	1.0-2.0	4.0	None to Moderate	Fair	Poor to Fair	Moderate to Severe
Galeston Fine Sandy Loam	3.5-4.0	<1.0 _b	None to Low	Fair to Good	Poor	Slight to Moderate

a - Filling should be avoided

b - No fill required if adequate surface drainage provided

Source: (Norfolk County Soil Survey and Field Observations)

square miles of land populated by over 500,000 people and empties into the James River at Hampton Road. Its components include the Main Stem, Southern, Western and Eastern Branches and the Lafayette River.

The soft, erodible sediments typical of the Coastal Plain Province allowed for the development of the branching pattern of the river. Tidal creeks adjoining the river branches add a second order of dendritic channels to the system. Eighteen of these smaller drainages lie within the corporate boundaries. Those that are named include Hoffler, Craney, Lily, Carney, Sterns, Baines, Hulls, Scotts and Paradise Creeks. Lake Kingman is actually a broad tidal creek as well.

All of these drainages, large and small, are low-gradient, slow-moving watercourses. As a result, the Elizabeth River has very poor flushing characteristics, and the entire river system, relative to other estuaries, is characterized by strong tidal influence and high saline content. The location of the Craney Island dredge disposal area effectively lengthens the Elizabeth River and further detains flushing. In addition, freshwater flow from the James River occasionally intrudes into the mouth of the Elizabeth River and creates a wedge of denser saltwater in deeper portions of the Elizabeth River. This also restricts flushing.

Flood hazard levels are not fully assessed for the tidewater area, but hazards can be estimated, based on the two tidal flood levels used by the U.S. Army Corps of Engineers: the Intermediate Regional Flood and the Standard Project Regional Flood (see Figure 2-1).

- ° The Intermediate Regional Flood is equivalent to a 100-year flood, approximately eight feet above mean water level. Such a flood would not reach travel far along the Western Branch but would inundate portions of Pinners Point, the Naval Hospital, the downtown area and Newtown.
- ° The Standard Project Regional Flood is the highest probably flood level (500-year flood). The effects of this flood would cover Craney Island, the Cox Property and the eastern half of Portsmouth south of the Western Branch.

WATER QUALITY

The water quality of the Elizabeth River has been more thoroughly studied than any other environmental element described in this report. This is because the Elizabeth River is one of the most heavily used waterways in Virginia. Because of its poor flushing

characteristics, the Elizabeth River retains pollutants that accompany heavy use for long periods, and the dominance of tidal influence also disperses pollutants upstream and downstream of pollutant entrance points. Even tributary creeks are subject to contamination from sources in the Main Stem and the major tributaries.

As would be expected, three centuries of heavy human use have radically changed both the physical and chemical nature of the Elizabeth River and its water quality. Except for low levels of Coliforms (primarily from waterfowl) and PAHs (from forest fires), most of the sediment and pollutants present in the river today were absent (or nearly so) from the original system. Fortunately, Portsmouth does not need to use the Elizabeth River for municipal water supply: The safe yield capacity of Portsmouth's reservoir/well system in Suffolk far exceeds projected water demands into the year 2030. Other metropolitan areas, such as Virginia Beach, may experience deficiencies, however.

The physical and chemical changes in the river do present a problem for other uses of the river and the coastal resources it provides. The effects of major uses such as large-scale ship-building, shipping traffic, wastewater treatment facilities, chemical industries, power plants and stormwater runoff are often detrimental to other uses, such as commercial and sport fishing and shellfishing, recreational boating, tourist facilities, riverside park space and residential use. Several studies have revealed that Elizabeth River sediments and water can produce toxic and lethal effects on amphipods, grass shrimp and fish. These effects are most pronounced in the Southern Branch and are apparently most closely related to PAHs and other organic toxins. Other tests have shown heavy metal accumulation in grass shrimp. Another result is that shellfish, other than crabs, may not be harvested from the Elizabeth River due to Coliform levels. They may not even be removed to cleaner waters to purge pollutants from them before consumption.

In the final analysis, an improvement in the six water quality conditions described below would promote diversified, pleasurable and profitable use of the coastal areas of the river.

1. Conventional Pollutants

The five conventional pollutants discussed here relate directly to the biological productivity and viability of the river.

Dissolved oxygen (DO) levels in the Elizabeth River range from good, near the river's mouth, to poor, in the Eastern and Southern Branches. DO levels are generally lowest in the Southern Branch and the deeper portions of the river. Daily violations of DO standards average five milligrams per liter. However, continuous oxygen depletion has not been observed, and conditions appear to be improving.

Biochemical oxygen demand (BOD) levels are an index of the amount of oxygen consumed during biological processes that break down organic matter in water. Greater concentrations of organic wastes (primarily from wastewater treatment outfalls) produce higher BOD values. BOD levels in the Elizabeth River are higher than average estuary values for the region. Available oxygen concentrations are lower in deeper portions of the river, so BOD values are lowest there.

The pH levels in the river system are in the standard range (pH 6 to 9) most of the time. The lowest levels and occasional violations are most frequent in the Southern Branch.

Fecal Coliform bacteria (Coliforms) levels are relatively high throughout the main channels of the river system and are highest near the mouth of the Western Branch. Coliforms present one of the more serious water quality problems in the river. The State standard for shellfish waters is a median density of total Coliforms below 14 per 100 milliliters of water. No areas of the river even approach levels that would allow commercial shellfish harvest. The potential health hazards of this condition preclude swimming and shellfish collection throughout the river.

Nutrient levels of total phosphorus are highest in the Southern Branch, and nitrogen levels are high in all the branches. Algal blooms occur in the Southern Branch, and chlorophyll "A" levels (indicating algal density) range from 10 to 20 milligrams per liter throughout the system. These levels, coupled with the low-light conditions produced by elevated sediment levels in the water column, are probably not high enough to initiate algal blooms in other portions of the Elizabeth River. Phosphate concentrations seem to be decreasing in all branches, but nitrogen does not show significant change.

2. Inorganic Toxics

This category includes heavy metals and other inorganic compounds. These compounds and organic toxic compounds present the greatest problem to Elizabeth River water quality and the greatest stress to river biology. The inorganic compounds listed below were found in the Elizabeth River in concentrations that exceeded United States Environmental Protection Agency (USEPA) toxicity criteria for saltwater aquatic life. (These standards are based on total metal concentrations rather than acid-soluble fractions that would affect living organisms, so the present limits may overestimate the actual impact.)

TABLE 2-2
Portsmouth Coastal Zone Land Use Plan
Selected Water Column Metal Concentrations from
Studies of the Elizabeth River

Metal	Test Concentrations (Average Values)	EPA Chronic Toxicity Criteria	EPA Acute Toxicity Criteria	Degree of Concern for Control
(All values in milligrams per liter mg/l)				
Mercury	0.4 - 9.7 means	0.025	2.1	High in main stem
Copper	17 - 21	Not set	2.9	High
Nickel	105 - 117	7.1	140	Moderately High
Zinc	35 - 69	58	170	Moderate in Western and Eastern Branches
Lead	12 - 20	5.6	140	Moderate
Cadmium	8 - 14	9.3	43	Moderate
Chromium	11 - 15	18	54	Slight

a - Long-term exposure to concentrations above these levels creates significant lethality in aquatic organisms

b - Short-term exposure to concentrations above these levels creates significant lethality in aquatic organisms

Source (Comprehensive Elizabeth River Water Quality Management Plan, 1986)

Table 2-2 summarizes the results of many tests for metal concentrations in the water column. Although metal concentrations in the water column have not shown clear annual trends, nickel and lead in the Southern Branch and mercury in the Western Branch have decreased over time. The highest concentrations of chromium and zinc occurred in the Eastern Branch. The highest mercury levels were in the Main Branch, and the highest zinc levels were in the Western Branch. Chromium was lowest in the Southern Branch.

Metal concentrations in the sediment of the Elizabeth River showed the highest levels of mercury, arsenic, lead and nickel in the Eastern Branch and the highest levels of zinc and cadmium in the Southern Branch. The lowest levels of arsenic, lead and nickel were in the Main Branch and the lowest levels of zinc and cadmium were in the Southern Branch. Compared to other estuaries, the Elizabeth River has sediment metal concentrations two to ten times higher than the middle of the Chesapeake Bay or the Potomac River. Lead and zinc concentrations are three times higher than in Lower James River sediments. Compared to the Baltimore Harbor (the Patapsco River), however, Elizabeth River sediment metal concentrations are lower: zinc and cadmium concentrations are only half as high as those in the Patapsco River; lead and copper concentrations are one fourth as high as in the Patapsco; and chromium concentrations are less than one tenth of those in the Patapsco.

3. Organic Toxics

Little information is available on specific concentrations of individual organic toxins or on chronological or geographic trends in concentrations. One study, comparing overall organic concentrations in the Chesapeake Bay region, showed the following organic toxin concentrations by geographic area:

Organic Toxins in the Chesapeake Bay Region

<u>Location</u>	<u>Concentration</u>
Lower Bay	10 parts per billion (ppb)
Mid-Bay	100 ppb
Upper Bay	1000 ppb
Baltimore Harbor/ Patapsco River	6,100 to 2.7 million ppb
Baltimore Harbor	20,000 to 200,000 ppb
Dredged Channel	
Elizabeth River	3,100 to 440,000 ppb

According to these figures, Elizabeth River sediments contain 10 to 10,000 times greater organic concentrations than Chesapeake Bay sediments, but one-half to one-tenth the organic concentrations found in Baltimore Harbor sediments. However, the concentration of sediments in the most heavily industrialized areas of the Southern Branch were twice as high as the highest concentrations in the Baltimore Harbor Dredged Channel.

Two specific organic compounds have been detected in the Elizabeth River system. Polynucleated aromatic hydrocarbons (PAH) compounds have been detected in the Main Stem and the Southern Branch of the river. Forest fires are an historic source of baseline levels of PAHs in sediments. Increased levels are attributable to the combustion of carbonaceous fuels, direct contamination by carbonaceous fuels such as coal dust from the Norfolk and Western Coal Terminal, contamination by oils, fuels, paints and solvents used by the ship building industry, and by creosote contamination. PAHs of compounds related to shipbuilding begin to appear in toxic levels just south of the Downtown Portsmouth Tunnel. The highest levels of PAHs, similar to compounds reported for creosote-contaminated waters, were collected near an operating creosote plant just north of St. Julian Creek. Further upstream, higher molecular weight PAHs were collected, probably attributable to power plants and major highway crossings.

Tributyltin (TBT) is an organotin pesticide. TBT is used in antifouling coatings on boat and ship hulls, and TBT compounds are used as bactericides and biocides in various industrial processes. Very little is known concerning TBTs in the Elizabeth River, but limited sampling has shown potentially toxic TBT levels near marinas and shipyards (up to 200 parts per trillion). There is increasing concern that TBT and related compounds may be present in high enough concentrations to create a biological hazard. TBT concentrations would be expected in a microlayer at the water surface, in the water column and in bottom sediment.

4. Industrial Pollutant Discharge

Industrial releases are the primary sources of the inorganic and organic toxic compounds in the Elizabeth River and a secondary source of nutrients. Industrial and municipal dischargers must receive permits from the National Pollution Discharge Elimination System (NPDES) and be classified as major industrial, minor industrial, major municipal or minor municipal NPDES permit holders. Figure 2-5 shows the permitted dischargers inside Portsmouth's corporate boundaries:

- ° Four Major Industrial NPDES-Permitted Dischargers along the Elizabeth River and inside Portsmouth's corporate boundaries are: The Craney Island Naval Fuel Depot, Virginia Chemical, Norfolk Naval Shipyard, and Atlantic Wood Industries.
- ° Most Minor Industrial NPDES-Permitted Dischargers are on the Norfolk side of the Main Stem and Western Branch of the river, but the following three are in Portsmouth: Cogentrix (near Lake Kingman), B.P. Oil Company (at the mouth of Paradise Creek), and Tarmac-Lonestar (in Port Norfolk). A fourth company, Marine Leasing Service (near the intersection of Interstate 264 and State Route 17), has a permit pending. The midtown and downtown Portsmouth tunnels are also NPDES-permitted minor dischargers.

Municipal wastewater dischargers are the primary sources of nutrients. The predominance of wastewater treatment facilities, food processors and fertilizer plants in the Southern Branch comprises a significant cumulative nutrient discharge. Municipal dischargers also cause elevated Coliforms and depressed DO and BOD, and municipal dischargers are a secondary source of organic toxics.

- ° The Major Municipal NPDES-Permitted Discharger in Portsmouth is the Pinner's Point Sewage Treatment Plant (STP). Two other major STP dischargers in Norfolk are Lamberts Point STP and the Army Base STP further north.
- ° Four Minor Municipal NPDES-Permitted Dischargers are in the Eastern Branch and Southern Branch, well away from Portsmouth.

5. Non-point Source Pollution

Non-point source pollution refers to pollutants that are transferred from general land surfaces to the Elizabeth River by natural processes. This transfer occurs after a rain by street runoff and stormwater runoff through drainage networks and occasionally through groundwater seepage. (Point source pollution involves controlled discharge from process-connected pipes.)

Sources of non-point pollution in the tidewater area include materials washed from waterfront industrial docks and pavements, drydocks, marinas, material and waste storage areas. Sources in urban areas include stormwater drainage outflows from streets and parking lots and land-disturbing construction. Sources in residential areas include septic fields in some locations during wet periods. Sources in agricultural areas include fertilizers (including recycled sewage sludge), pesticides, animal waste and sediment.

The major sources of non-point pollution in Portsmouth include waterfront industries and marinas, stormwater drainage outflows (predominant in southern Portsmouth: See Figure 2-5), agricultural runoff (in northern Portsmouth), ongoing construction and perhaps septic tank systems. The pollution includes virtually every pollutant type, but often in lesser amounts and concentrations than from point sources. Non-point pollution is controllable by Best Management Practices (BMPs) that involve careful land use planning, design and maintenance. Few of the non-point pollution sources have permit or operational controls in the tidewater area.

6. Dredging Operations

Except for the shoreline development that has already occurred along the Elizabeth River, the greatest human-induced physical impact to the Elizabeth River is the continuing development and maintenance of shipping channels. Continued dredging operations to maintain channel depth are essential to provide safe shipping lanes. Currently, a series of channel reaches connect the James River to the intracoastal waterway at Deep Creek and the Southern Branch. The Craney Island, Port Norfolk, Town Point and Lower/Middle reaches of the Southern Branch pass by Portsmouth. Smaller reaches, which extend to the Western Branch and Scotts Creek, may be expanded in the near future.

These activities also have a direct impact on water quality. Bucket or pump siphon-dredging produces equal amounts of suspended sediments. Higher turbidity (water cloudiness from suspended sediment) tends to increase water temperature and decrease dissolved oxygen. Maintenance dredging creates only temporary effects of this nature. Of more concern, resuspension of contaminated sediments reintroduces heavy metals and PAHs into the river system. Studies have shown that such increased exposure increases intake of metals (and presumably PAHs) by aquatic organisms, particularly oysters and clams. The State Water Control Board requires core samples and analyses for PAH and particle size before dredging operations are permitted.

Another study investigated the "trapping efficiency" or sediment retention ability of the Craney Island rehandling basin, a 35-acre dredged holding facility that temporarily stores dredge material awaiting disposal within the Craney Island dredge disposal area. The study indicated that the basin was an effective trap for sediments discharged into it. Sediment could escape during ebb tides through the northern barge access channels. Some uncertainty remains concerning the ability to retain PAH-laden sediments from the Southern Branch, but discharge in the western portion of the basin during favorable tidal phases would maximize retention.

VEGETATION

In predevelopment times, the natural vegetation of the Portsmouth area consisted of expansive underwater and above-water growth. Eelgrass and widgeongrass beds flourished in submerged shallows of the Elizabeth River. Broad tidal flats and expansive salt marshes formed the margin between land and water in most places. Beyond tidal influences, forests of red maples, gums, water-loving oaks, tulip trees and green ash trees predominated. This forest type graded into drier forests of loblolly pine stands with pockets of gums, oaks, beeches and hickories.

The original forest cover of Portsmouth is entirely gone. Only young forest and scrub serve as natural groundcovers today. A few older trees, natural or planted, are in or near residential areas today. In many locations, wetlands have been drained or filled. In other coastal areas, wide marshes have been reduced to fringe marsh. The original beds of submerged aquatic vegetation have succumbed to high sedimentation and pollution in the Elizabeth River. Embayment marshes have been reduced greatly by filling and channeling. Although most wetland community types of vegetation still exist, they exist in narrower bands due to filling and reduction of gently sloping lands subject to periodic inundation within the tidal range. Emergent and scrub/shrub wetlands have experienced significant declines throughout Virginia.

As part of this study, existing tidal wetlands along Portsmouth's coast were investigated. Sources included U.S. Fish and Wildlife Service National Wetland Inventory Maps, unpublished survey information from the Virginia Institute of Marine Science and recent aerial photography (ground truthed by site visits). Portsmouth's non-tidal wetlands were not mapped nor analyzed as part of this study, because these freshwater wetlands are not directly connected to Portsmouth's coastal zone. Coastal wetlands are defined in Virginia as all land lying between and contiguous to mean water and an elevation above mean water equal to a factor 1.5 times the mean tidal range. Wetland types were classified using guidelines prepared by the Virginia Institute of Marine Science and the Virginia Marine Resources Commission (pursuant to Chapter 2.1 of Title 62.1, Code of Virginia). Submerged aquatic vegetation such as eelgrass and widgeongrass were not surveyed: High nutrient and turbidity conditions in the Elizabeth River system preclude extensive bed growth.

1. Tidal Flat Wetlands

Significantly, 333 acres of non-vegetated tidal flat wetlands exist along the James River, Craney Creek, the coast between the mouths of Craney Creek and the Western Branch, and along some shore segments of the Western Branch. Most of these areas are sand/mud mixed flats (Type XV), and sand flats (Type XIV) with some mud flats (Type XVI). Approximately two percent of Portsmouth's beach is intertidal beach (Type XIII), primarily along the Elizabeth River between the Western Branch and Craney Creek. These non-vegetated wetlands also have shown a recent trend of decline.

2. Emergent Wetlands

Approximately 502 acres of emergent wetlands remain along Portsmouth's coastline (see Table 2-3 and Figure 2-1). These emergent wetlands are primarily confined to tidal creek basins with segments of narrow fringe, point or pocket marsh along parts of the Elizabeth River and some creek segments. Roughly 30 percent of Portsmouth's coast is lined by narrow fringe marsh and another 25 percent encloses more extensive marshes. The largest contiguous portion of emergent wetlands (about 108 acres) is along Hoffler Creek, which flows into the James River along Portsmouth's northwest boundary. Other creek systems with relatively large embayment marshes are Craney, Sterns, Baines, and Paradise Creeks. Most of Portsmouth's emergent wetland acreage is a collection of many smaller embayment and fringe marshes. Most smaller marsh areas still perform valuable functions related to wetlands.

- ° Saltmarsh Cordgrass (Type I) is the primary vegetation in the emergent wetlands. This type dominates both embayment and fringe acreage.
- ° Saltbush Community (Type IV) comprises a narrow band of highwater bush and marsh elder shrubs along the upland borders of most marshes. This community is most prevalent in the Hull and Sterns Creek drainages.
- ° Some areas of greater diversity within the saltmarshes could be classified as Brackish Water Mixed (Type XII) Communities. These are in small areas of Baines, Hoffler and Paradise Creeks. Plants in these areas include marsh fleabane, saltmarsh aster, water hemp, seaside goldenrod and rushes.
- ° Saltmeadow (Type II), comprised mostly of saltmeadow hay, fills portions of wider creek basins, such as Hoffler and Baines, at elevations slightly higher than saltmarsh cordgrass.

Table 2-3

Major Aerial Extent of the
Coastal Wetlands of Portsmouth, Virginia

<u>Saltmarsh Complex by Drainage Segment</u>	<u>Area in Acres</u>	
Hoffler Creek (Portsmouth side only)	107.6	
Western Branch (exclusive of tidal flats)	68.7	
Craney Creek	97.5	
Baines Creek	55.4	
Paradise Creek	31.5	
Sterns Creek (Portsmouth side only)	37.6	
Lake Kingman	22.5	
Lily Creek	29.7	
Creek at Pinehurst	7.9	
Scotts Creek	5.7	
Creek at Waterview/Westhaven	17.2	
Creek at River Park	15.1	
Creek at Cox Property	4.5	
Hulls Creek	0.8	
Total Saltmarsh Acres	501.7	(0.78 square miles)
 <u>Tidal Flats by Drainage Basins or Neighborhoods</u>	 <u>Area in Acres</u>	
Hoffler Creek/Rivershore	51.6	
Craney Creek	56.7	
Cox Property and adjacent	89.1	
Bayview Blvd.	19.8	
Greenbriar to Westhaven	86.2	
Sterling Point	15.3	
Park Manor	13.8	
Total Tidal Flats	332.5	(0.52 square miles)
Total Area of Major Coastal Wetlands	834.2	(1.30 square miles)

Source: Woolpert Consultants, Aerial and Ground Reconnaissance, 12/7/87 and
1/13-14/88 (Acreages obtained by planimetry).

- ° Cattails (Type VI) fringe some marsh borders, especially where freshwater runoff collects. The largest expanses are at Hoffler and Baines Creeks.
- ° Black Needlerush (Type III) forms clumps 10 to 20 yards wide in other communities in Hoffler, Baines, Hulls, Waterview/Westhaven, Sterling Point and Craney Creeks.
- ° Reedgrass (Type VIII) is spotty but generally distributed. It is most prevalent at Paradise, Craney, Scotts, Waterview/Westhaven and Baines Creeks.

3. Wet Forest

Wet forest is adjacent marsh edges at several locations. The widest buffer areas are along Hoffler and Craney Creeks. Trees include sycamores, red maple, sweet gums and ashes. Honeysuckles, trumpet creeper, poison sumac and bittersweet are prevalent in some places. Natural upland woods (most extensive north of the Western Branch) include loblolly pines, oaks, American holly, sweet gum, wax myrtle and redbud. Popular planted species are Southern magnolias, crepe myrtles, live oaks, dogwoods, pines and Eastern red cedars.

WILDLIFE

The diversity and abundance of wildlife along Portsmouth's coastal zone are directly related to the distribution and variety of water and vegetation resources in the area. Of the 199 major wildlife species recorded for Portsmouth, 107 are associated with deep water or wetland habitats. Of the 35 game species present, 29 use these same habitats. Historically, the coastal environments of Portsmouth have offered the most diverse, extensive and important wildlife habitats available. Today, the decrease in water quality, submergent vegetation beds and coastal wetlands has reduced the productivity and quality of the aquatic ecosystem.

Physical and chemical water quality parameters have shifted to ranges that support a less desirable and commercial community. The loss of wetlands and the increased sedimentation and pollution have adversely affected the spawning and feeding capability of remaining commercially valuable finfish and shellfish in the river. Reduced aquatic and wetland vegetation has also decreased the value of the area for waterfowl and other birds and mammals, including a number of sensitive, rare or endangered species. The disappearance or shrinkage of the original tidal flats has adversely affected many shorebirds and blue crabs and also some fish.

The following description is an overview of animal life in the Elizabeth River and along Portsmouth's coast. Attention is given primarily to species of commercial, game or aesthetic importance.

1. Shellfish

Oysters tolerate wide variations in salinity, temperature and water level. Strong currents carrying adequate particulate food over suitable attachment substrate are the primary requirements for oyster bed establishment. Figure 1 shows public and private lease oyster grounds, which have formed in many locations throughout the wider portion of the Elizabeth River. These grounds are presently condemned (closed to harvest) but could reopen if levels of coliforms, PAHs and metals were reduced. Neither oysters nor hard shell clams are present in very high densities. Because of the pollution stresses and prevalence of MSX disease in the Elizabeth River, it is questionable whether the river adds greatly to the seed oyster budget of the James River. Commercial harvest in the Elizabeth River is almost entirely confined to blue crabs. In 1986, about 241,108 pounds of blue crab were harvested, with a net cash value of \$54,400. Most blue crabs spawn at thimble shoals, but limited spawning occurs in the Elizabeth River.

2. Finfish

Little information is available on fish species in the Elizabeth River because it is virtually unused as a commercial fishery. Studies near the mouth of the river have found 30 to 34 species of fish. Commercially important fish found in the river include American and gizzard shad, river herring, striped bass, white perch, catfish, spot, Atlantic menhaden and Atlantic croaker. Although the Elizabeth River system is not directly a commercial fishery and most important commercial fish spawn in fresher or more saline waters, the river does play a role in supporting the abundant and diverse commercial and recreational fishery of the lower Chesapeake Bay. The Elizabeth River may serve as a nursery area for semianadromous fish such as striped bass, white perch and gizzard shad. The river may be a secondary nursery area for Atlantic menhaden, spot and Atlantic croaker (based on a ratio of young fish in survey catches). Spawning species may include Bay anchovies, Atlantic silversides, killifish, hogchokers, mummichogs, naked gobies, sheepshead minnows and winter flounders. The Elizabeth River supports good populations of forage fish such as mummichogs, bay anchovies, Atlantic silversides and young Atlantic menhaden. Other seasonally abundant species include hogchokers and spot.

3. Terrestrial and Semiaquatic Life

The terrestrial and semiaquatic lifeforms that inhabit or occasionally visit coastal wetlands are a diverse assemblage. The tidal flats support high densities of amphipods, worms, clams and snails that serve as food for blue crabs, fish, birds and mammals. The saltmarshes support abundant worm, insect, snail, grass shrimp and fiddler crab populations. Fiddler crabs in particular serve as a major food base for many fish, bird and mammal consumers. The tidal marshes support Atlantic ribbed mussels among other large molluscs.

Some 30 species of amphibians (salamanders, frogs and toads) and 21 species of reptiles (lizards, snakes and turtles) are among the wildlife species of Portsmouth. These animals were not evident during the winter site visits for this survey. About half (26) of these species primarily inhabit the salt and freshwater habitats available.

4. Birds

At least 103 bird species have been recorded in Portsmouth. Most use either the open water or wetland habitats available in Portsmouth. Twenty-six species, primarily waterfowl, are game species within the State. Although these species are not directly available as game in Portsmouth, use of the habitat in Portsmouth helps stabilize the population in the region. During field surveys, 47 winter resident bird species were observed. The most common waterfowl observed were hooded mergansers, mallards, lesser scaup, American widgeons, canvasbacks and bufflehead. Other common water birds included double-crested cormorants, ring-billed and herring gulls, American coots, sanderlings, kingfishers, great blue herons and clapper rails. Some other species observed in or over wetlands included mockingbirds, song and swamp sparrows, killdeer, American kestrels, Cooper's hawks, marsh hawks, common and fish crows, and mourning doves. (Although only great blue herons were observed during the winter survey, the wetlands are home to many herons and egrets year round. These birds bring a particular beauty to the marshes.)

5. Mammals

About 33 mammal species are known to inhabit the Portsmouth area. Only half are common. Gray squirrels, perhaps the most prominent species, make little use of coastal habitats. The most common marsh species include the meadow jumping mouse, Virginia opossum, raccoon, marsh rice rat and long-tailed weasel.

RARE AND ENDANGERED SPECIES

No federally-listed threatened or endangered species are known to have been observed in the corporation limits of Portsmouth. The most likely species to occur, based on geographical location and habitat availability, would be migrants such as loggerhead turtles or bald eagles. Other marine turtles or shortnose sturgeons are secondary possibilities.

Two federally-proposed threatened species, the southern bog lemming and Rafinesque's big-eared bat, may be present in Portsmouth. Though primarily found in the Dismal Swamp, southern bog lemmings have been recorded in Portsmouth, Chesapeake, Norfolk, Suffolk and Virginia Beach. This species is a year-round resident that prefers grassy fresh wetlands predominated by giant cane, softstem bulrush and sedges. Red maple is the most common tree in suitable habitat. Home ranges are less than half an acre. This habitat is restricted to inland wetlands, the headwaters of tidal creeks and perhaps a few coastal terraces beyond tidal influence. The Rafinesque's big-eared bat is known to be in the Dismal Swamp area. It commonly roosts in abandoned structures by permanent water and is very sensitive to human disturbance.

Two state-listed endangered species have been recorded near Portsmouth. The chicken turtle is known to be from one location in the cypress ponds of Seashore State Park. This species could occur in still water such as ponds, lakes, ditches and swamps. The Eastern tiger salamander is known to be in Virginia from a breeding population in Augusta County and other collections in York County. This salamander requires freshwater ponds and heavy organic detritus or fallen logs, a habitat not widely available in Portsmouth.

Some additional species, listed as sensitive by the Virginia Office of Game and Inland Fish, are especially prone to disease and decline due to their exacting habitat requirements or sensitivity to synthetic chemicals such as pesticides. As a result, their population dynamics can give the first clues to problems with habitat variables such as available acreage, hydrology, water quality or terrestrial pollution. Table 2-4 lists these species and some details about their biology.

CULTURAL RESOURCES

The cultural resources discussed in this section are archaeological remains of prehistoric or historic habitation of Portsmouth and historically significant architecture in the form of single structures or designated districts. Portsmouth has more sites on the

National Register of Historic Places than any other city in Virginia. In 1988, the General Assembly designated the Lower James River as a state Historic River (H.B. 935). Many of Portsmouth's cultural resources are quite near the existing coast, indicating that early inhabitants exhibited the same close interdependency on coastal water resources that continues today. Cultural resources along Portsmouth's coastal zone are shown in Figure 2-2.

The known archaeological sites for Portsmouth are concentrated along the Elizabeth River north of the Western Branch and along Craney Creek. These sites are cataloged by the Virginia Historic Landmarks Commission's Research Center for Archaeology with a three part code such as 44 Pm 1. Figure 2-2 shows only the last digit of this code (designating site number) because every site is in Norfolk County (the meaning of code number 44) and in the City of Portsmouth (the meaning of the code designation Pm).

Most of the archaeological sites are affiliated with the Archaic Indian culture (6000 B.C. to 1000 B.C.) and are represented by quartz and quartzite flakes, which demonstrate that stone was used to fashion implements. Site 44 Pm 2 (2 on the map) is a nineteenth century brick foundation, including sand-mortared bricks, walls and a chimney base.

Site 44 Pm 12 (12 on the map) is primarily affiliated with the Woodland Indian culture (1000 B.C. to 800 A.D.) and is represented by flakes and cord-impressed potsherds. This site could be the Indian village of Mattanock. This large site also has features of eighteenth and nineteenth century European habitation. Specimens collected included Chinese porcelain, pearlware and unglazed earthenware.

Site 44 Pm 12 is the only known site in Portsmouth that is recommended for a Phase II archaeological survey. This does not preclude the possibility that additional ground surveys, new construction or reconstruction may reveal other areas significant enough to require documentation and excavation.

Four of the five Historic Districts in Portsmouth are adjacent or near the Elizabeth River. The largest is the Cradock Historic District (127-37) along Paradise Creek, which contains construction from the World War I era. This neighborhood was one of the first planned communities built in the United States. The second largest historic district is Port Norfolk (124-51), which is adjacent Hull Creek and the Western Branch. A third district, designated Portsmouth Olde Towne (124-34) by Crawford Bay, is the old residential area of Portsmouth, which was annexed in 1763. The fourth district, Parkview Historic District (124-55), contains many old homes just northwest of Portsmouth Olde Towne.

TABLE 2-4
Portsmouth Coastal Zone Land Use Plan
Sensitive Species within the Portsmouth Area

Species	Status	Wetland Use	Major Stress
Chicken turtle	e	1	Habitat alteration - drainage
Eastern tiger salamander	e	1	Habitat loss
Red-shouldered hawk	s	2*	Pesticides
Sharp-shinned hawk	s	2*	Pesticides
Little blue heron	s	1*	Habitat alteration - water quality and depth, and insecticides
American kestrel	s	2*	Pesticides
Black-crowned night heron	s	1*	Pesticides
Virginia rail	s	1*	Loss and alteration of extensive marshes
King Rail	s	1*	Loss and alteration of extensive marshes
Big-brown bat	s	2*	Habitat loss, pesticides
Evening bat	s	2*	Habitat loss, pesticides
Rafinesque's big-eared bat	T	2	Habitat loss, pesticides
Southern bog lemming	T	1*	Habitat loss, pesticides

e - State endangered
s - State sensitive
T - Federally proposed threatened

1 - Primary habitat importance
2 - Secondary habitat importance
* - Observed in Portsmouth

Source (Virginia Office of Game and Inland Fish; Virginia Natural Heritage Program)

Three other historical properties are along the Main Branch of the Elizabeth River. These are, from north to south: the Portsmouth U.S. Naval Hospital (124-36), the Seaboard Coastline Building (124-53) and Drydock No. 1 in the U.S. Naval Shipyard.

WETLANDS

The wetlands have a strong connection to every coastal natural resource in the Portsmouth coastal zone. For this reason, it is appropriate to describe in a separate section how vital it is to the viability of Portsmouth's coastal zone to preserve the wetlands.

General Land Form

Existing wetlands offer opportunity for open space, vistas and recreational/educational uses while increasing residential property values.

Soils

Many types of wetlands are highly effective shoreline stabilizers, sediment traps and erosion buffers. A marsh only two feet wide has significant value as a sediment trap. Extensive root systems bind and build shoreline soils.

Hydrology

Existing wetlands, especially tidal flats and saltmarsh cordgrass, dissipate wave energy and further control erosion. Wetland land and water interfaces produce specific habitat characteristics of moderated flow regime, water levels and salinity that support fish and wildlife production. Many wetlands act as very efficient flood and storm buffers by absorbing encroaching water.

Water Quality

Wetlands not only trap sediment, but also transform and assimilate most pollutants such as the nutrients threatening the Elizabeth River. Natural processes within wetlands also help offset poor DO, BOD, pH and temperature conditions.

Vegetation

Saltmarsh cordgrass communities are highly productive ecosystems (up to 10 tons/acre/year) and as such are the basis of many food pathways on land and in the water. These marshes, especially coupled with tidal flats, are strongly connected to estuarine and marine systems. Tidal action flushes roughly half of all net production of salt marshes into adjacent waters in the form of detritus (decayed plant material).

Fish and Wildlife

Marsh flush detritus supplies a rich source of energy that stimulates estuarine and marine productivity. All shellfish and about 95 percent of all commercial fish depend on this source, either directly or indirectly, for food. The marshes also provide spawning and nursery habitat. Many birds, amphibians and reptiles depend heavily on wetlands-produced food sources such as the plants themselves, fish and other aquatic organisms. The cumulative benefit to both aquatic and terrestrial animals increases with the extent and diversity of the wetland habitats available.

Endangered Species

Although wetlands cover only five percent of the land in the United States, 35 percent of the federally-listed endangered species are dependent on them. All the federal-listed and state-listed species likely to be found in Portsmouth depend on wetlands.

Cultural Resources

Many wetland areas in Portsmouth as in the rest of the tidewater region are of historic or archeological interest because of the presence of shipwrecks, cargo or prehistoric Indian habitation.

II. ANALYSIS OF THE BUILT ENVIRONMENT

This section will examine the built environment of coastal Portsmouth. It will analyze the existing land use and historic development patterns, zoning, circulation and access, infrastructure, recreation and open space and economic development opportunities and constraints along Portsmouth's coastline today.

EXISTING LAND USE AND HISTORIC DEVELOPMENT PATTERNS

This section examines the existing land use along the Portsmouth coastline. The existing land use patterns are illustrated in Figure 2-3.

Residential

Residential uses, both single and multi-family, are the primary land use throughout coastal Portsmouth. Most residential land uses are single-family residences.

The residential uses are primarily along the Western Branch of the Elizabeth River, the south shoreline of Scotts Creek, Sterns Creek, Barnes Creek, Craney Creek and Hulls Creek. Other residential uses are along the south shore of Paradise Creek, and new residential developments are being constructed near Hoffler Creek.

Most of the residential units along the waterfront are of high quality -- some in the \$100,000 to \$200,000 price range. Most waterfront homes have private docking facilities and therefore have no need for public boat ramp access.

Commercial and Office

Commercial land uses occur throughout Portsmouth's coastline. These uses are predominantly restaurants, marinas or marine-related commercial uses. Other commercial uses are located at the far reaches of the Elizabeth River tributaries not accessible by boat, even during high tide. Office land uses are exclusively along the downtown waterfront.

Commercial and office land uses currently make up only a small portion of coastal Portsmouth, but two downtown riverfront sites could be developed into commercial or office space. The Old Coast Guard Property just south of downtown is another potential location for commercial and office development.

Industrial

Industrial land uses make up a large portion of the Portsmouth coastline. Pinner's Point Marine Terminal and the Virginia Chemical plant in West Norfolk are two major industrial locations. Other industrial uses are along Paradise Creek.

Government uses are a separate land use category, but many government functions along the Portsmouth coastline are industrial. If these were included as industrial land uses, the size of the "working waterfront" would increase significantly.

Most remaining tracts of large vacant land are zoned for industrial use, and the City of Portsmouth's current Future Land Use Plan indicates these areas as industrial. If these areas are developed as planned, the amount to industrial land will increase significantly.

United States Government

The coastline has an abundance of federal installations and facilities. The United States Naval Shipyard, United States Naval Hospital, United States Coast Guard Base, Craney Island Fuel Depot and Craney Island dredge disposal basin all have water frontage.

Except for the Craney Island dredge disposal basin, these uses are not expected to change. Craney Island dredge disposal basin could, in 25 to 50 years, become an industrial or recreational use. However, the likelihood of Craney Island dredge disposal basin reverting from federal jurisdiction is presently remote.

Parks and Open Space

The coastline has several areas of recreational uses or natural open spaces. City Park, along the Western Branch of the Elizabeth River, has two public power boat ramps, one public sail boat ramp, playgrounds and a golf course. A private golf club, Elizabeth Manor Country Club, also is located along the Western Branch. A public beach near Old Bayview is underutilized as a recreational asset and is not maintained.

Most open spaces are environmentally sensitive areas such as tidal creeks, floodplains and their associated salt marshes. These land uses are located throughout the coastal areas.

Vacant and Agricultural Uses

Few vacant, developable areas remain along coastal Portsmouth. The largest vacant area is the Cox Property, a 600-acre site in West Norfolk. This site is currently a combination of agricultural and open space uses and is zoned for industrial use.

Approximately 37 acres of northern shoreline of Scotts Creek are currently vacant and zoned for industrial use. A plan being developed for Scotts Creek, however, shows this site being developed as a "marine industrial park" that would compliment the residential nature of the Creek's southern shoreline.

A final, major vacant area is a triangular tract of land bounded by Victory Boulevard, Paradise Creek and the southern City limits. This tract is also zoned as industrial and is shown as an industrial use in the Future Land Use Plan.

Agricultural uses along the waterfront occur at the Cox Property and along Craney Creek and Hoffler Creek. Agricultural uses are being converted to residential and mixed-use developments. It is expected that agricultural uses will continue to diminish as development pressure continues.

Historic Development Patterns

In 1752, Colonel William Crawford, an English entrepreneur, plotted 65 acres of what is now known as the City of Portsmouth. The town grew and, in 1763, had its first annexation. In 1767, Colonel Crawford and Andrew Sprawle founded the Towne of Gosport and a shipyard south of Portsmouth. This shipyard first served the British Fleet, then the United States Navy, then the Navy of the Confederate States of America. The Towne of Gosport was annexed by Portsmouth in 1784, forever linking the City's economy to maritime uses.

Through the first half of the nineteenth century, Portsmouth continued to thrive as a port-town. In 1830, the Naval Hospital was completed, and, in 1834, the first drydock in America was constructed at the Navy Shipyard. The War between the States brought both physical and economic destruction to Portsmouth, and the effects of this war were felt until the end of the century.

At the end of the nineteenth century, the City began to prosper again. In 1894, Portsmouth annexed what is now known as Parkview, and by the end of the century, Portsmouth's population had grown to 17,527 people.

The twentieth century brought continued growth to Portsmouth. In 1909, the City annexed Scottsville and Prentiss Place. The outbreak of World War I brought thousands of shipyard workers to Portsmouth -- and with them, a boom in housing construction and creation of the Villages of Cradock and Truxton. At the end of the War, in 1919, Portsmouth annexed the Port Norfolk area, and by 1920, the City's population had reached 54,387.

The Great Depression adversely affected Portsmouth as it did the rest of the nation, but by the end of the 1930s, activity at the Naval Shipyard began to increase as a prelude to World War II. As with the first World War, a great influx of workers created the need for more housing. The City once again annexed land in 1948. This annexation and post-war industrial expansion pushed the City's 1950 population to 80,039. In 1952 the first Elizabeth River tunnel was completed, and, 10 years later, a second tunnel was completed. The City continued to annex surrounding areas. In 1960, Cradock, Mexander Park, Simonsdale, Elizabeth Manor and other suburban areas were annexed, bringing the City's population up to 114,773.

Industrial development continued through the 1960s with the opening of the Portsmouth Marine Terminal in 1967. The City's land mass grew significantly in 1968 with the annexation of West Norfolk, Craney Island and parts of Churchland. During the late 1960s, the population trend reversed, and the City began losing population. The 1970 population was only 110,963. Population losses continued through the 1970s, and by 1980 Portsmouth's population stood at 104,577.

The 1980s have been a time of economic turn-around for Portsmouth. During this time there have been several new subdivisions and the Sandy Pointe condominium complex has been developed. A downtown revitalization effort has also been developed. The old Beasley Farm site is being developed into a mixed-use development to be called River Pointe, and there is interest in developing the northern shore of Scotts Creek.

Portsmouth has been, and is, economically tied to the Elizabeth River. From the early days as a port dependent on the river to ship goods to and from inland plantations to its present-day capacity as a key military and commercial port, Portsmouth has relied on the coast for its survival.

ZONING AND COASTAL DEVELOPMENT CONTROLS

This section examines existing subdivision and zoning regulations along Portsmouth's coastline. The zoning districts are illustrated in Figure 2-4.

Overview of the City of Portsmouth Land Use Regulations

1. Zoning Ordinances

The most direct controls Portsmouth can exercise over development and land use are the regulations in the Zoning Ordinance. The current Zoning Ordinance addresses coastal zone management issues in a limited way. Two zones, the W-1 Waterfront District and the P-1 Preservation District, are intended to regulate uses appropriate on the waterfront.

The W-1 zone is a mixed use district, which allows limited office use, marinas and other commercial, recreation and residential uses. The district is intended to be developed at a relatively high intensity. Buildings with more than 10 stories are allowed a 60-percent lot coverage, and buildings with fewer than 10 stories are allowed a 90-percent lot coverage. There are currently three W-1 zones in Scotts Creek and Crawford Parkway near the Naval Hospital. This zoning district is specifically intended for use in the area of the Elizabeth River and Crawford Parkway. All three W-1 zones are developed with marinas and some additional restaurant and residential uses.

The P-1 District is intended for environmentally sensitive areas, parkland and open space. Permitted uses in the district include low-intensity recreational uses, cemeteries, and crop and tree farming. Portsmouth currently has only one P-1 zone: The City Park and the Olive Branch cemetery along the Western Branch. These are in open space use, in conformance with the regulations.

Much of the shoreline is zoned for residential use along the Western Branch and along most of the tributaries that feed off of it. The eastern coastline along the Southern Branch and Main Stem is predominantly zoned for manufacturing and U.S. Navy and Coast Guard activity. The exception is the D-1 Downtown zone just south of the Naval Hospital.

Development along the shoreline will have direct effects on the quality of the coastal environment. The controls placed on new development on limited vacant tracts will have the most direct impacts on the shoreline. Redevelopment and further regulation of existing development areas can also improve the coastal environment. Development throughout Portsmouth will have an indirect effect on the coastal environment. Point and non-point source pollution, erosion and sedimentation are affected by inland development as well as by coastal development. Techniques can be included in the zoning ordinance to have a positive effect on the coastal environment. Changes to the text or map of the ordinance that direct new development on vacant tracts in manufacturing zones would make it easier for the city to control point source pollution, erosion and sedimentation. Modifications to zones regulating developed residential, commercial and industrial zones would have a less immediate effect but could improve non-point source pollution, erosion and sedimentation in the long term.

In existing residential zones, several permitted uses and allowable development practices may be adding to the degradation of the shoreline environment.

- ° Crop and tree farming are permitted uses in the R-150, R-100, R-75, R-75-S, R-60, and R-60-A districts. The chemicals and plowing techniques used in modern farming contribute significantly to non-point source pollution and to erosion. In districts that are developing as residential, particularly in R-100 to R-60, agriculture is not compatible and does not need to be a permitted use. Although agriculture is not a predominant or economic use in these districts, permitting it creates the potential for it to develop without any provisions for mitigating potential problems. Agriculture is also an inappropriate use in the P-1 district, particularly given the intention of that district.
- ° Stormwater runoff carries non-point sources pollutants and erodes land. The amount of ground covered with impervious surfaces such as concrete, asphalt, buildings, sidewalks, inground swimming pools and parking lots directly effects storm water run-off. The more surface covered, the greater the runoff. Lot coverage should be further restricted in all districts and should be defined as any impervious surface covering the ground and not just as buildings.

Industrial and commercial zoning district modifications also have the potential to improve shoreline quality. Most vacant land along the shoreline is zoned for manufacturing. The permitted uses in the M-1 and M-2 manufacturing zones allow a wide range of uses, some of them with the potential to contribute to point and non-point source pollution more than others. General regulations could require establishments to document the materials stored and the use to be made of them. Further, uses that could be hazardous should be designated conditional uses rather than permitted uses. Conditional use regulations could require special conditions and a special permit for the uses. Records of these permits would help City Staff keep track of potential point source pollution problems, especially for small establishments. Limiting the location of these uses would further reduce the threat of point source pollution.

The planned unit districts, planned office park (POP), commerce park district (CP) and the residential planned unit development overlays are designed to provide flexible, compatible developments on parcels over 20 acres. Aside from requiring open space and review of applications for compatibility with the comprehensive plans, there are no specific criteria relative to environmental impacts.

2. Subdivision Regulations

The Portsmouth Subdivision Regulations direct the location and layout of much of the residential development that has occurred recently in the City, particularly in the north part of the City. These regulations also guide the development of commercial and industrial land when subdivision of property takes place. Subdivision regulations are primarily designed to control the infrastructure such as streets, sidewalks and utilities. These regulations work with zoning regulations, which guide land uses in certain parts of the City.

The Portsmouth subdivision regulations address environmental issues in several provisions. The regulations prohibit development on land that is unsuitable due to flooding, poor drainage, or "other situations that could be hazardous to residents." Regulations also provide that natural features should be preserved whenever possible.

Anyone applying for a subdivision permit must submit an application that documents the environmental features of the site including water boundaries, high waterline, bulkheads, piers, top of bank and toe of slope. The applicant is also required to submit plans for controlling possible sedimentation and erosion problems during construction and after. Specific criteria for review are not identified in the regulations. Review by City Staff is required to ensure appropriate development techniques. Offsite drainage requirements are reviewed by the City Engineer to ensure appropriateness.

The subdivision regulations control the width of streets, sidewalks and parking areas. This controls the amount of ground coverage by impervious surfaces, and as discussed in the previous section on zoning, has an impact on storm water runoff.

3. Erosion and Sedimentation Control Ordinance

The erosion and sedimentation control ordinance requires that anyone altering or disturbing land must obtain a permit, with the exception of those using the land for public purposes. These guidelines deal primarily with construction activity. Permits are required for activity based on a developer's compliance with appropriate mitigation techniques during construction.

CIRCULATION AND ACCESS

This section analyzes existing public access and private access to the waterfront as well as the existing roads and streets to these areas.

Public Access

Public access includes both boat and pedestrian access. The largely residential, industrial and governmental nature of Portsmouth's coastline leaves few areas for the general public to gain access to the water by foot or boat.

City Park has Portsmouth's only public boat ramps: two power boat ramps and one sailboat ramp. The power boat ramps were poorly designed and are currently being reconstructed to better facilitate the boat launchings. The sailboat ramp is adequate for small sail boats (10 to 15 feet long). It is inadequate for larger sail boats without motors because these boats have difficulty navigating to an area where the water is deep enough to allow insertion of the center board. City Park is also one of the few public places where the waterfront can be viewed. Downtown Portsmouth offers public access as do areas along Crawford Bay. An additional public access area is the Old Bayview beach. The continued use of this area is uncertain because of the uncertainty of how the proposed Western Freeway will connect with the Martin Luther King Expressway. Public access in other areas is hindered by private boat slips, private marinas and industrial and governmental facilities.

Vehicular circulation to these areas is adequate because each public access area is served by a thoroughfare which is designed for higher volumes of traffic. Potential public access areas will be discussed later in the recreation and open space section.

Private Access

Private access to the coastline is excellent. Most homes with water frontage have private docks for their boats and there are several marinas for people without water frontage to dock their boats. The City of Portsmouth has aggressively sought to attract boat owners and marina expansion. The City cut its personal property tax rate on boats in 1985 from \$4.35 to 50 cents in an attempt to become similar to Wilmington, Delaware which has successfully lured boat owners and marina expansion with no boat tax.

Vehicular circulation to the private marinas, however, often routes traffic through established residential neighborhoods. Although not as disruptive as trailered traffic, these marinas do generate a traffic volume that is higher than normal.

INFRASTRUCTURE

This section examines the City's existing water, sanitary and storm sewer systems to determine if the major vacant undeveloped areas are serviced by water and sewer lines and what the major drainage outfalls are in the City. The following section (Coastal Zone Impact Dynamics) examines the potential impacts of stormwater drainage on natural resources. Therefore, this section of this analysis will not be as detailed.

Undeveloped Areas

1) Cox Property

The Cox Property is not currently serviced by public water or sewer lines. Due to the proximity of the U.S. Coast Guard Base to the north and the Virginia Chemical Industrial Complex to the south, there should be little problem with extending both water and sewer lines to the Cox property.

2) Scotts Creek

The Scotts Creek site is serviced by both public water and sewer lines. The site's proximity to the Portsmouth Marine Terminal and Pinner's Point Sewage Treatment Plant should ensure the availability of these utilities.

3) Vacant Area Along Paradise Creek

This site is serviced by both public water and sewer lines. The site's proximity to the U.S. Naval Shipyard and related industrial areas should ensure the availability of these utilities.

4) Old Coast Guard Site

Because of the previous use of this site, it is serviced by both public water and sewer.

5) Craney Island Fuel Depot

This site is serviced by both public water and sewer lines.

6) Craney Island Landfill

This site is not serviced by public utilities. However, due to its proximity to existing developments, extensions of utilities to this site should not be difficult. Of more importance would be the suitability of the soils in regards to the laying of underground pipe.

Drainage Outfalls

Drainage outfalls are discussed in more detail in the next section (Coastal Zone Impact Dynamics). The existing major stormwater outfalls that drain the City of Portsmouth are illustrated in Figure 2-5. These outfalls have caused some creeks to experience filling and in an extreme case, necessitated the construction of a box culvert for continued drainage. Any new developments will contribute to this problem unless proper mitigation measures are undertaken.

RECREATION AND OPEN SPACE

This section builds on information already presented in the existing land use and circulation and access sections. Specifically, this section identifies existing recreation and open space areas and identifies potential new recreation areas and open space areas that should be preserved to protect environmental quality.

The major recreation area is City Park. The City of Portsmouth's Recreation Plan recommended developing additional water-related parks throughout the City. The recommended sites for additional boat ramps included Elm Street in Scotts Creek near the west Norfolk Bridge in the short-term and on Paradise Creek in the long-term. Parks were recommended to be developed at Scotts Creek (in conjunction with the boat ramp) and at Bayview Boulevard.

Based on field observations and interviews, several other areas should be considered for future park and recreational development. These areas as well as the existing recommended areas are shown in Figure 2-5.

As Figure 2-5 indicates, few areas remain for recreational development. However, there are opportunities to develop park and recreational facilities as part of larger commercial or residential developments.

Several environmentally sensitive open space areas should be preserved. These areas center on saltmarsh cordgrass marshes in upper creek drainages. Of particular importance is the Hoffer Creek wetlands area and the tidal creeks that penetrate into the Cox Property. Since these areas are just beginning to be developed, any development at these sites should include mitigation measures to protect these vital natural areas.

ECONOMIC DEVELOPMENT OPPORTUNITIES AND CONSTRAINTS

This section describes economic development opportunities and constraints along the coastline.

Cox Property

The Cox Property represents an opportunity for Portsmouth to attract a marine-related industry that requires a large land mass and deep-water port access. The proposed Western Freeway would also provide excellent vehicular access to this site.

The two tidal creeks that penetrate into the Cox Property should not be disturbed and could constrain development. The tidal flats all along the coast pose a significant constraint to port dredging because they are protected under Chapter 300, Acts of Assembly, 1982. Many archaeological sites are also present, including one recommended for further survey. The City does not own this parcel of land and the current owners are not presently considering its sale.

Scotts Creek

Scotts Creek's northern coastline offers an excellent opportunity for some type of economic development. This site is publicly owned and plans call for the development of a "marine industrial park" for this site. The mouth of Scotts Creek marks the zero-mile marker on the intercoastal waterway, offering an interesting marketing tool if the area is developed.

Vehicular access to the site is poor, but planned improvement via an interchange off of the Martin Luther King Expressway will help. Scotts Creek currently lacks adequate depth to accommodate large pleasure craft during low tide, making boat access questionable also. The site itself is somewhat narrow and any non-industrial use such as an up-scale marina or restaurant would need to be buffered from the Portsmouth Marine Terminal's heavy industrial uses. This adds to the perception that the site is narrow. The number of marinas that could be constructed from the shoreline to the main channel of the creek would also be constrained.

Vacant Area Along Paradise Creek

The vacant area along Paradise Creek at the southern city limits offers an area for further industrial development. The location of this site south of the Naval Shipyard provides what would seem to be an ideal location for some kind of contractor or vendor who supplies the Navy. Vehicular and ship access appear to be adequate.

The site is small and any development would be constrained to some degree. Overhead power lines are also present at this site which may, in effect, divide the site into parcels that are too small for development.

Old Coast Guard Site

The Old Coast Guard site, sandwiched between the downtown and the Naval shipyard, offers opportunities for office, commercial and light industrial development. This area is serviced by all utilities and has deep water access. The site's proximity to Interstate 264 and the downtown tunnel also provides it with adequate vehicular access which will get even better once the second tunnel is opened.

The limited amount of water frontage will constrain the type of development that could take place. The relatively barren nature of the surrounding area and the site's distance from the downtown core could make it initially difficult to attract development.

Craney Island Fuel Depot

The large land mass upon which this facility is located offers a long-term development opportunity. Much of the land is currently underutilized and the need to provide a land-side refueling depot for Naval vessels is decreasing. This would then provide additional areas for industrial developments that need deep water access.

This site's availability is more than 20 years in the future. The willingness of the Department of Defense (DOD) to relinquish this property is unknown but is not likely to be very great. Even if the DOD relinquished this site, other federal agencies (i.e., Department of Transportation/Coast Guard) would be given first priority on acquiring the property. The quality of the site -- such as possible contamination due to fuel spills -- is also unknown.

Craney Island Dredge Disposal Area

The Craney Island dredge disposal area offers an opportunity for future, long-term mixed-use development. It is likely (due to soil-bearing strength characteristics) that the future development could have intense industrial activities along the eastern third of the site with the western two-thirds developed as a recreational site. This arrangement would use the most stable soil for industrial development while providing a recreational "buffer" between this industrial development and the residences along River Shore Road.

This site is not likely to be ready for development for 25 to 50 years. There are additional concerns such as soil contamination that could constrain development. The largest constraint, however, is likely to be Portsmouth's inability to acquire the site after the U.S. Army Corps of Engineers relinquishes it. The DOD may want to retain the site for future facility development.

III. COASTAL ZONE IMPACT DYNAMICS

HISTORIC MODIFICATIONS TO THE NATURAL ENVIRONMENT

Historic Land Form

The original landscape of Portsmouth was very different from the urbanized area today. The original forest cover has been cleared, the great majority of wetlands filled or drained, and the Elizabeth River has been dredged to provide deep shipping channels. The Elizabeth River was once twice as wide and half as deep as it is today. Much of the original sloping marsh waterfront has been replaced by artificial stabilization in the form of bulkheads and seawalls. Tidal flats have been dredged. Wide marshes have given way in many other areas to much thinner fringe marshes. Heavy waterfront industrialization and shipping traffic are the major sources of these modifications. Over 40 percent of the Portsmouth shoreline is artificially stabilized today.

Soils

Agriculture started near Old Portsmouth and gradually replaced the original forest cover. Clearing spread inland to the west and then north of the Western Branch. Gradually, residential development followed the same course. By 1950, only the westernmost portion of Portsmouth was still in agriculture. Churchland and Twin Pines were the only concentrated development north of the Western Branch and were surrounded by agriculture. In the past 40 years, most of those remaining soils have been further disturbed by residential development. Most land areas have been graded or filled within Portsmouth. The most significant areas of original soil are within creek basins and north of the Western Branch. The above landscape modifications have tended to increase erosion. This erosion has resulted in increased cloudiness of Elizabeth River water. This has reduced photosynthesis and increased nutrients and temperature. All of these factors have reduced oxygen levels in the river.

Hydrology

The surface water hydrology of Portsmouth is dominated by a network of stormwater drains, ditches and drainage tile. Only a few areas retain water or have completely unimpeded flow within stream banks. Portions of most creeks have experienced construction filling on a smaller scale than the Elizabeth River but sediment runoff filling on a relatively larger scale. Among others, there have been partial construction fills along Baines and Paradise Creeks and at River Park. One tidal creek near existing Interstate Route 264 has been completely filled by development and was replaced with a five- by 11-foot box culvert. Most creeks in urbanized areas have experienced significant sediment filling. Several man-made ponds are separate

from surface drainage but most act as sediment basins and have outflows that eventually reach the Elizabeth River drainage. The Elizabeth River has never had strong flushing characteristics and the shoreline modifications, channel dredging and location of Craney Island dredge disposal area may further impede flushing. Many stormwater outfalls tend to become obstructed by the combination of heavy sediment in runoff and poor flow/flushing conditions within the creeks and river. Many stormwater outfalls, by necessity, must also be within the range of periodic tidal inundation.

The present stormwater infrastructure is seriously deficient in terms of its location in a flat coastal area with erodible soils and tidal backwater conditions. A management system that includes all practicable measures to keep sediment out of the transport pipes and to minimize off-site transport of water would help eliminate the present problems. Such a system would integrate improved site design features to reduce erosion/runoff with in-system structures to retain silt and water on site. These design measures are discussed in detail in a later chapter.

Water Quality

Land-disturbing activities, heavy industrialization and shipping have meant heavy sediment and pollution loads in the Elizabeth River. Except for low levels of Coliforms (primarily from waterfowl) and PAHs (from forest fires), most of the sediment and pollutants present in the rivers today were absent (or nearly so) from the original system. As would be expected, three centuries of heavy human use have radically changed both the physical and chemical nature of the Elizabeth River and its water quality. Several studies have revealed that Elizabeth River sediments and water can produce toxic and lethal effects on amphipods, grass shrimp and fish. These effects are most pronounced in the Southern Branch and are apparently most closely related to PAHs and other organic toxins. Other tests have shown heavy metal accumulation in grass shrimp. Shellfish, other than crabs, may not be harvested from the Elizabeth River due to Coliform levels. They may not even be removed to cleaner waters to purge pollutants from them before consumption.

Vegetation

The original forest cover of Portsmouth is entirely gone. Only young forest and scrub serve as natural groundcovers today. A few older trees, natural or planted, are in or near residential areas today. Wetlands have been drained or filled in many locations. In other coastal areas, wider marshes have been reduced to fringe marsh. The original beds of submerged aquatic vegetation have succumbed to higher sedimentation and pollution within the Elizabeth River.

Embayment marshes have been reduced greatly by filling and channeling. Although most wetland community types still exist, they exist in narrower bands in many places due to filling and reduction of gently sloping lands subject to periodic inundation within the tidal range. Emergent and scrub/shrub wetlands have experienced significant declines statewide. In terms of recent decline, we estimate that approximately 18 acres of saltmarsh and an unknown acreage of tidal flats have been destroyed in Portsmouth in the past 12 years (1976 to 1988).

Wildlife

The diversity and abundance of wildlife has decreased in relation to loss in areal extent and quality of aquatic and terrestrial habitats. The decreased water quality, submergent vegetation beds and coastal wetlands have all had a role in reducing the productivity and quality of the aquatic ecosystem of the Elizabeth River. Physical and chemical water quality parameters have shifted to ranges that support a less desirable and commercially viable community. The spawning and feeding capability of remaining commercially valuable finfish and shellfish within the Elizabeth River is affected by the loss of wetlands and increase of sedimentation and pollution within the system. Reduction of aquatic and wetland vegetation has also directly decreased the value of the area for waterfowl, other birds and mammals, including a number of sensitive, rare or endangered species. Many of the original tidal flats are gone or reduced greatly in extent. This negatively affects many shorebirds and blue crabs and some fish.

PLANNED AND PROPOSED DEVELOPMENT ACTION

This section examines planned and proposed development actions along Portsmouth's coastline.

RiverPointe

This 120-acre mixed-use development is currently being developed upon the old Beasley Farm. This development is to be a corporate office center and planned residential community. The change from an agricultural use to an office and residential use will increase the amount of stormwater runoff.

Scotts Creek

The Scotts Creek development focuses on the northern shoreline. This 37-acre site is zoned as industrial, but recent plans recommend the establishment of a marine industrial park that would allow uses such as boat service and repair; engine maintenance and repair; hull repair; sail lofts; electronic sales and service; and boat yards. This development would require dredging a deep water channel from the Elizabeth River to the development area.

A second, unrelated development involves the development of an 186-slip marina near Moon Engineering at the mouth of Scotts Creek. This development will nearly triple the number of slips on Scotts Creek.

Tidewater Yacht Agency Expansion

The Tidewater Yacht Agency has expressed some interest in expanding their operations in Crawford Bay. Preliminary considerations include a floating boatel, condominiums and parking deck. This proposed expansion is primarily designed to attract large boats, but smaller boats will also be able to take advantage of the facilities.

Downtown Developments

Two sites along the downtown waterfront are vacant. The first site is located between the ferry landing and the Seawall Restaurant, while the second site is located between the Lighthouse Museum and the Naval Shipyard Museum. Existing plans call for these sites to be developed as a hotel and an office complex.

Old Coast Guard Site

The old Coast Guard site south of the downtown area, is currently vacant. Redevelopment of this site has been limited to the construction of a television station office. The Housing Authority proposes to construct a luxury residential complex on the site. However, the City's Economic Development Department feels that an office/commercial mixed-use development would be more appropriate.

City Park Restaurant

The City has issued a Request for Proposals for the development of a 400-seat restaurant and marina and 100-vehicle parking space at City Park. It is not known if the City has awarded any contracts regarding this proposal or when this development would be completed.

IMPLICATIONS FOR THE VIABILITY OF THE COASTAL ENVIRONMENT

This section briefly addresses necessary considerations for maintaining the viability of coastal resources while planning and developing some planned or potential development sites. All coastal developments should include construction and maintenance plans to reduce negative impacts to Elizabeth River water quality.

Planned and Proposed Developments

1. RiverPoint

This property possesses soil characteristics fairly suitable for construction, but with moderate to severe erosion potential. Preservation of woods and wetlands is necessary to maintain suitable sediment control and surface water hydrology.

2. Scotts Creek

Suitability of soils may need to be determined because the area is unsurveyed. Channel dredging will require permit certifications under the Clean Water Act and Wetlands Protection Act. Fringe marsh should be left in place by sensitive design plans. Design should also consider compatibility with residential areas to the south.

3. Tidewater Yacht Agency Expansion

A permit to develop over subaqueous land must be secured. Views from Olde Towne and Crawford Bay could be preserved by reasonable height limitations.

4. Downtown Developments

Developments would be near the old Seaboard Coastline Building, but should not produce significant visual impact to this historical site since the surrounding environment is totally urbanized.

5. Old Coast Guard Site

No significant coastal resources constraints are associated with this area except eventual control of effluent and non-point source impacts to water quality.

6. City Park Restuarant

Soils have not been surveyed, but secondary data sources indicate that the soils are subject to erosion. Additional impervious surfaces should be tied into existing retention basins. Marina development should minimize disturbance to fringe marsh.

Other Potential Development Areas

1. Vacant Area Along Paradise Creek

In addition to land availability constraints, alterations to the banks of Paradise Creek are precluded at most places by fairly wide saltmarsh areas.

The site is not large enough for heavy industry. Other potential developments would have no significant negative impact on the Cradock Historic District.

2. Cox Property

This property possesses soils with moderate bearing strength and erosion potential. Bearing strength decreases and erosion potential increases along a 200- to 300-foot strip of land adjacent the Elizabeth River. Filling or obstruction of wetlands (Lake Kingman and two smaller tidal creeks) and surrounding wooded buffers would destroy wetland viability and site hydrology. Dredging for deep water ports would necessitate destruction of tidal flats anywhere on the property. Presence of rare plants or animals would have to be determined as on other properties. This property contains many archaeological sites; one site, if disturbed, would require a Phase II survey.

3. Craney Island Fuel Depot

Soil investigations would have to be performed for any construction requiring high bearing strength. Buffer zones should be left adjacent Craney Creek wetlands. An archaeological survey is appropriate for this area. Water quality goals should consider rehabilitation of nearby oyster beds.

4. Craney Island Dredge Disposal Area

The dredge fill presents problems of inconclusive bearing strength and contamination characteristics when the facility is finally closed. Again, eventual development should be sensitive to maintaining water quality parameters within limits to allow use of shellfish resources around the facility within the James River and eventual use within the Elizabeth River.

IV. SYNTHESIS OF PROBLEMS AND OPPORTUNITIES

This section synthesizes the problems and opportunities that are present along the Portsmouth coastline and summarizes the Portsmouth Coastal Zone Management (CZM) issues. It also identifies the Portsmouth Coastal Zone Land Use (CZLU) Plan goals and policies and provides an overview of CZM techniques.

SUMMARY OF PORTSMOUTH CZM ISSUES

The issues that currently exist that affect the Portsmouth coastline can be categorized into three major areas: environmental protection, economic development, and public access. Within each of these three major issue areas are sub-issues that, at times, overlap into other issue areas. Major issue areas and sub-areas are summarized in this section.

Environmental Protection Issues

1. Water Quality of the Elizabeth River Is Poor

The first sub-issue is the poor water quality of the Elizabeth River. Both elevated metals and organic toxins have been found in the river, making it unfit for swimming, fishing and other water-related recreational activities. Effluent violations and poor housekeeping of waterfront developments will continue to degrade Elizabeth River water quality. The poor quality of the river is compounded by the abundance of uncontrolled non-point source pollution found in the area. The reauthorization of the Federal Water Pollution Control Act this year places new emphasis on the control of non-point source pollution.

2. Development Pressure Is Increasing on Wetland Areas

Because of the lack of vacant, developable land within Portsmouth, the existing coastal wetland areas are receiving increased development pressure. That is, as less suitable land for development is available, these valuable wetland areas are perceived as opportunities for development.

3. Erosion Control and Stormwater Management Could Be Improved

Another problem with the increased amount of development in coastal areas is the increase in stormwater runoff that contributes to non-point source pollution. Increased erosion probability also accompanies land disturbance, which in turn could increase the amount of siltation in the coastal areas.

4. No Zoning Regulations Protect Privately-Owned Environmentally Sensitive Areas

While the existing zoning ordinance does have a Waterfront District (W-1) and a Preservation District (P-1), these districts do not promote protection of privately-owned environmentally sensitive areas. The protection of privately-owned environmentally sensitive areas will help decrease the development pressure on these areas, help reduce non-point source pollution in the coastal areas, and help ensure the long-term productivity and economic well-being of Portsmouth's natural and man-made resources.

Economic Development Issues

1. Portsmouth has Limited Vacant Land for Economic Development

The City of Portsmouth is both land-locked and water-locked. The City is becoming increasingly "built-up," leaving limited amounts of vacant land for future economic development. The majority of vacant areas also have coastline, and are in some cases, environmentally sensitive. These characteristics create a conflict between the need to protect the environmentally sensitive areas and the need to expand the City's tax base through economic development. In addition, the recent passage of the Chesapeake Bay Preservation Act could have a significant impact on waterfront developability in Portsmouth.

2. Long-Term Economic Impact of the Craney Island Landfill Is Unknown

The Craney Island Landfill represents an opportunity for the City of Portsmouth to acquire additional land for economic development. This opportunity, however, will not be available for 25 to 50 years. The Craney Island site may not be able to be developed intensively because of soil stability and other environmental factors. It is quite possible that the City of Portsmouth may never be able to acquire the site because of Government Accounting Office (GAO) procedures regarding excessed land. The Department of Defense may wish to retain the Craney Island Landfill once the U.S. Army Corps of Engineers are finished with it.

3. No Zoning Regulations Promote Waterfront Industrial Developments

While the existing zoning regulations do have a waterfront district (W-1), this district does not promote industrial developments that require deep-water access. The current W-1 District promotes the development of high-density residential

and commercial land uses. Several existing vacant parcels that have waterfront access may be suited for development of industrial uses that require deep-water access. However, without a proper zoning district, less intensive industrial use that does not take advantage of the water frontage could be developed.

Public Access Issues

1. Public Boat Ramps Are Limited

Portsmouth has only two public power boat ramps (four boat lanes) and one public sailboat ramp for a population of more than 100,000. The sailboat ramp is inadequate for 15 to 25 foot sailboats due to the shallow draft of the river bank area. Using the standard of one lane per 12,500 people, the City should have approximately eight boat lanes to service adequately its population. However, because of the large number of private docks and the presence of more "attractive" boat ramp locations within the Hampton Roads, some debate exists concerning the need for additional boat ramps.

2. All Public Boat Ramps Are in City Park

All public boat ramps in Portsmouth are in City Park. City Park is not readily accessible to most Portsmouth residents, forcing many residents to drive quite a distance to get to the Park. Proposed locations for future boat ramp locations, in some cases, would cause disruption of the surrounding neighborhoods because of the increased traffic and noise.

3. Built-Up Coastline Impedes Public Access Opportunities

Most of Portsmouth's coastline is developed as residential, industrial or governmental uses. Public access to the water, both physically and visually, is impeded because of existing development. Currently, the two largest areas from which the public can reach the waterfront are City Park and downtown Portsmouth. With the finite amount of vacant waterfront land available, appropriate public access points to the water will become even more scarce and difficult to locate.

**PORTSMOUTH COASTAL ZONE
LAND USE PLAN GOALS AND POLICIES**

The Portsmouth CZLU Plan goals and policies were formulated to address the various issues that exist regarding coastal Portsmouth.

Environmental Protection Goals and Policies

Goal: Improve the Water Quality of the Elizabeth River

Policy A: Proposed new source discharges should be evaluated for consistency with water quality goals and should not be permitted to result in a net increase of pollutant loadings such as organics and metals to the Elizabeth River.

Policy B: Sanitary sewage collection systems and components should be upgraded to meet Virginia sewerage Regulations Class I reliability standards.

Policy C: The City of Portsmouth and the U.S. Department of Defense should continue present efforts to eliminate infiltration and inflow to the public sewerage collection systems.

Policy D: The enforcement of existing discharge permit limits and housekeeping improvements for dry docks and other ship construction, repair or refurbishing areas must be continued and enhanced where appropriate.

Policy E: Performance standards for non-point source pollution control through the zoning regulations and subdivision ordinance should be established. Existing stormwater rules should be upgraded to include better retention, infiltration and sediment collection standards.

Goal: Relieve the Development Pressure on Existing Wetland Areas

Policy A: A local wetlands board should be established, subject to adequate state funding and technical assistance, to review all site plans and other development materials.

Policy B: The local wetlands board should rigorously apply all appropriate Wetlands and Subaqueous Lands Guidelines that have been developed by the Virginia Marine Resources Commission (VMRC) and the Virginia Institute of Marine Science (VIMS).

Policy C: Alterations of wetland should be evaluated for the potential to affect both water quality (nutrients, oxygen, water circulation and sediment) and general ecology (food production, nursery and spawning cover).

Policy D: The local wetlands board should conduct a continuing public awareness program on wetlands protection and the environmental consequences of development in wetland areas.

Goal: Create Development Regulations that Protect Environmentally Sensitive Areas

Policy A: A coastal area overlay zone should be considered to identify areas worthy of protection.

Policy B: Zoning performance standards should be considered for the development of environmentally sensitive sites.

Policy C: Development codes and regulations should result in construction methods that are appropriate for environmentally sensitive lands and development that will not degrade wetlands or other environmentally sensitive areas.

Economic Development Goals and Policies

Goal: Create Opportunities to Expand the City's Tax-Base in Appropriate Coastal Areas.

Policy A: Coastal areas should be developed to enhance the City's quality of life, not detract from it.

Policy B: Mixed use types of development should be considered for larger coastal areas, particularly the Cox property.

Policy C: The Craney Island Dredge Disposal Area should ultimately be excessed for private development and conservation.

Goal: Create Zoning Regulations that Promote Marine Industrial Development at Appropriate Locations.

Policy: A coastal area overlay zone should be established that will identify areas which should be reserved for development of marine-related industries.

Goal: Improve Public Access to the Coastline

- Policy A:** Portsmouth residents should be surveyed concerning their perceptions of the need for additional public boat ramp access.
- Policy B:** Public access points and vistas should be preserved along Portsmouth's coastline.
- Policy C:** Site plan and other development reviews should be used to ensure physical and visual public access to the Elizabeth River and its tributaries.
- Policy D:** Access should be provided, where warranted, through public acquisition of specific parcels and the use of easements on privately developed parcels of land.
- Policy E:** Publicly and privately owned shoreline should be kept clean so that Portsmouth's residents can continue to enjoy this aesthetic resource.
- Policy F:** Development along tidal creeks should be carefully sited and where appropriate, clustered to minimize impacts along the creek. Where residential development already exists, the City should negotiate with the U.S. Army Corps of Engineers and affected property owners for the maintenance dredging of such creeks to accommodate small pleasure boat access.

OVERVIEW OF COASTAL ZONE MANAGEMENT TECHNIQUES

Environmental Management Techniques

Wise management of Portsmouth's coastal resources (and their associated environmental, economic and social assets) will promote the present and future health, safety and welfare of its residents and those in adjacent communities. Appropriately applied engineering, regulatory and integrated design techniques allow necessary economic development of coastal areas while addressing maintenance of coastal zone assets. Techniques for maintaining these valuable resources center on management of erosion, hydrological modifications, vegetation and associated fish and wildlife. Erosion can be managed by implementing careful grading and sediment collection plans (both during and after construction), preserving buffer zones that utilize the natural erosion control of vegetation, and leaving unstable soils undisturbed.

Hydrology management includes maximization of retention and infiltration areas for runoff from impervious surfaces; placement of stormwater runoff outflows to minimize alteration of flow regimes within natural systems; and optimization of water circulation around structures developed within open water (e.g. marinas). Non-point source and industrial process water pollution controls are integrated with water flow management.

Vegetation management includes maintaining saltmarsh and upland buffer zones that are wide enough to provide associated values of erosion control, hydrology moderation (including flood control), species diversity, and wildlife habitat.

Fish and wildlife management relies on the above vegetation, water and soil management techniques. Additional considerations include maintaining sufficient diversity; retaining habitat types that preserve sufficient areas of quality habitat to support associated wildlife; controlling physical degradation of marine environments that results from sediment and pollution; and providing special requirements for sensitive game and endangered species.

Environmental Zoning Techniques

Three common methods exist for regulating environmental conditions through zoning: separate shoreline zoning districts, protective overlay zones and permit processes.

Zone districts, much like the P-1 district in Portsmouth, are designated to allow a limited number of uses that will not negatively affect the environment. Other districts, such as the W-1 district in Portsmouth, should be designed to provide space for water-dependent or related uses.

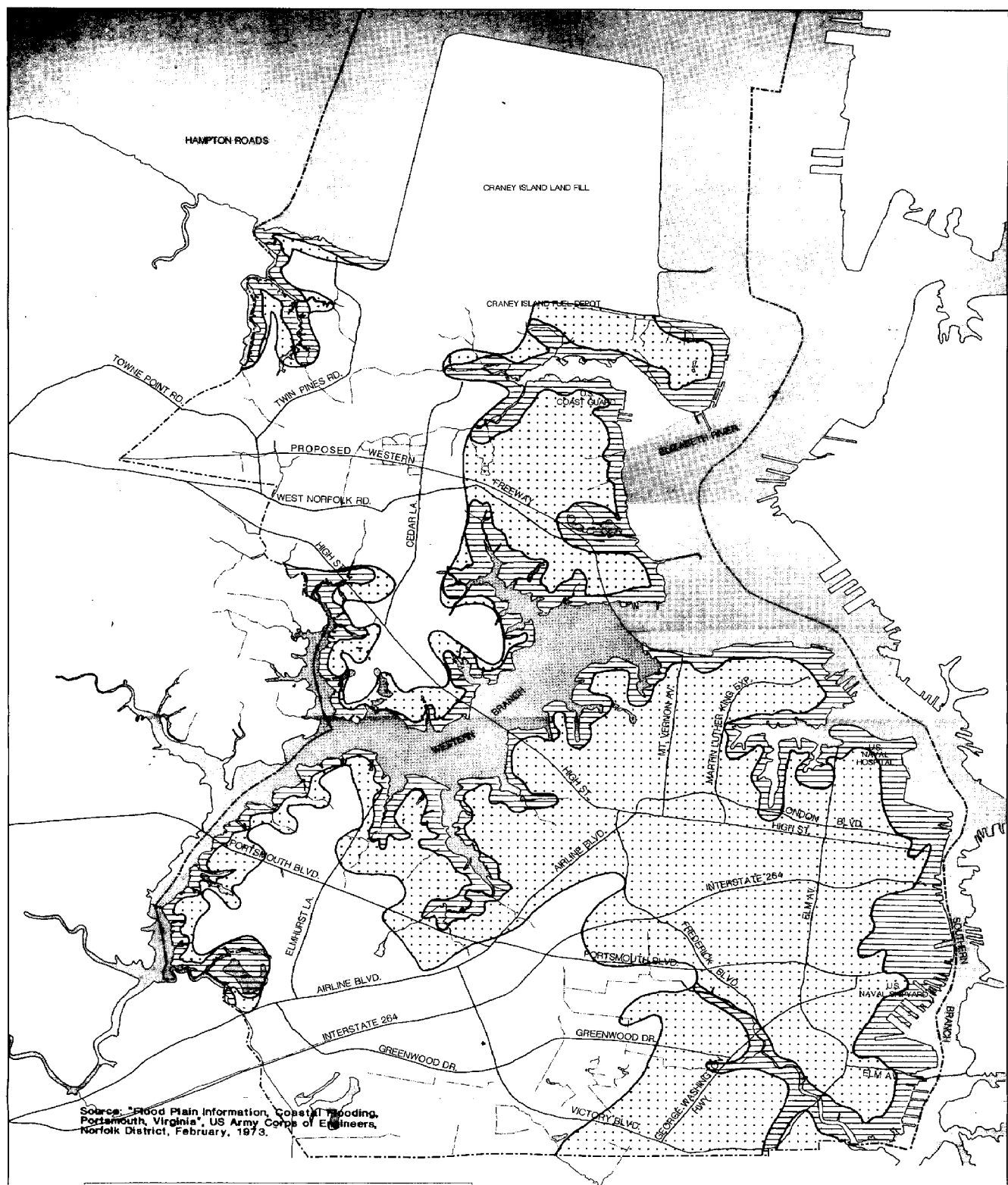
Overlay districts require adherence to additional environmental regulations in coastal areas in addition to (or instead of) the standard regulations that apply to the base zone, regardless of the use. Additional regulations requirements to consider include setbacks from the shoreline; public access to the shore; views; lot coverage; beach, tidal flat and wetland protection; storm drainage; waste disposal; shore alteration; and structures in the water. Some overlay coastal zones may also require a site plan review to document further the impact of proposals on the coastal environment.

Permitting processes are generally used to regulate very specific development types such as dredging, cut and fill activity, bulkheads, lagooning and similar activities that can alter the physical character of the shoreline. In some cases, permit processes are so comprehensive that they function similar to overlay districts, requiring permits for most types of coastal development.

Portsmouth has two special waterfront zones, P-1 Preservation District and the W-1 Waterfront district. Most of the existing regulatory power that positively affects environmental conditions are the erosion and sedimentation control regulations and the off-site drainage requirements found in the subdivision regulations.

The communities surrounding Portsmouth have developed various techniques to deal with coastal protection issues. The City of Newport News does not have special waterfront districts nor a specific coastal overlay zone. It regulates waterfront development through a floodplain district. The City of Norfolk has seven waterfront zones with distinct land use requirements. The City of Virginia Beach has two preservation zones for coastal areas: the preservation district and the special areas designated and controlled by the wetlands ordinance.

The zoning controls in Portsmouth and in the Hampton Roads area in general are regulating the construction phases of development and are protecting floodplain and sensitive environmental areas. But the controls are not regulating major land use areas in ways that could have a positive long term impact on coastal zone environmental quality.



Source: "Flood Plain Information, Coastal Flooding, Portsmouth, Virginia", US Army Corps of Engineers, Norfolk District, February, 1978.

Portsmouth Virginia

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CITY OF PORTSMOUTH, VIRGINIA

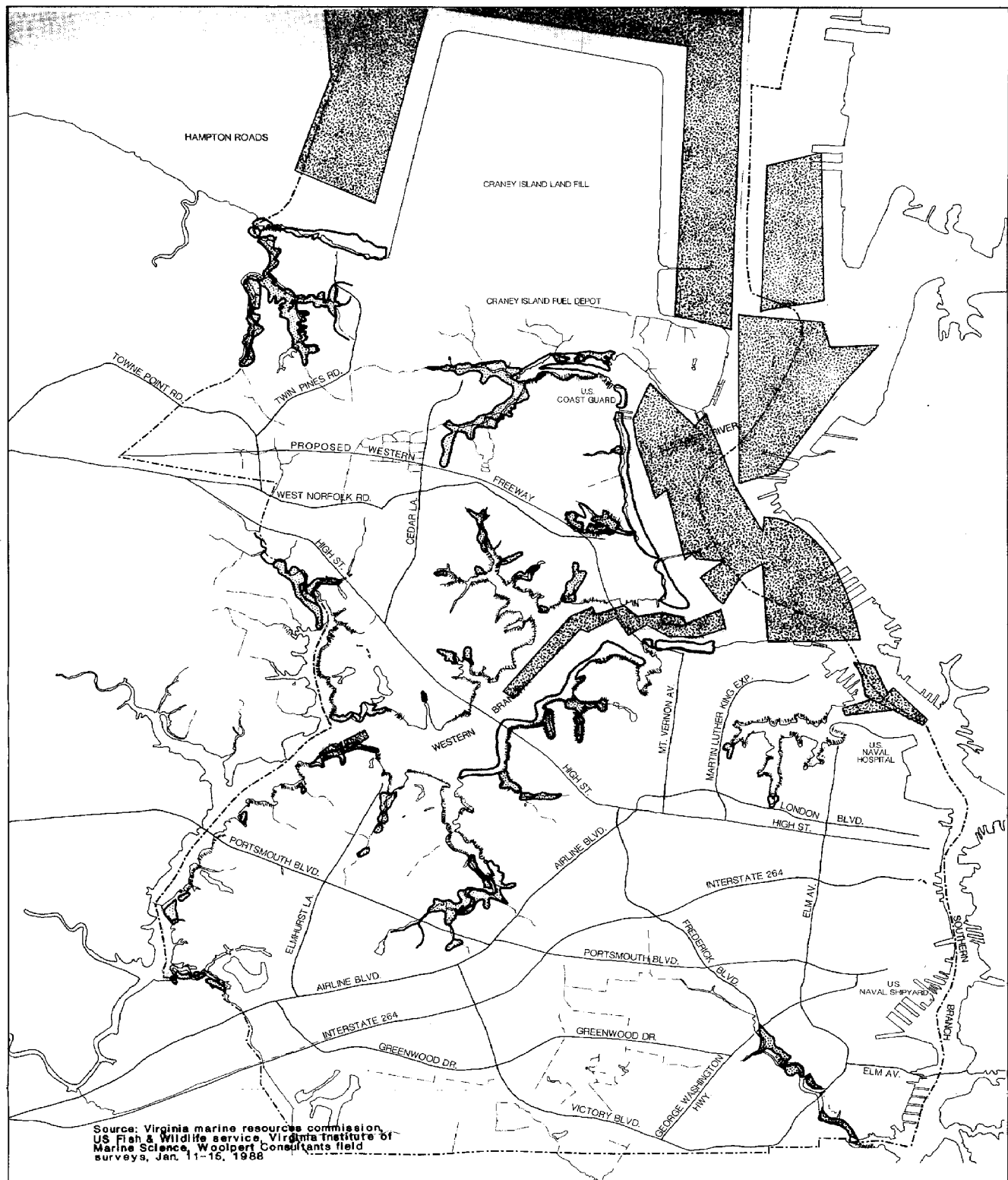


Figure 2-1

FLOODING POTENTIAL

LEGEND

-  Intermediate Regional Tidal Flood
-  Standard Project Tidal Flood







Portsmouth Virginia

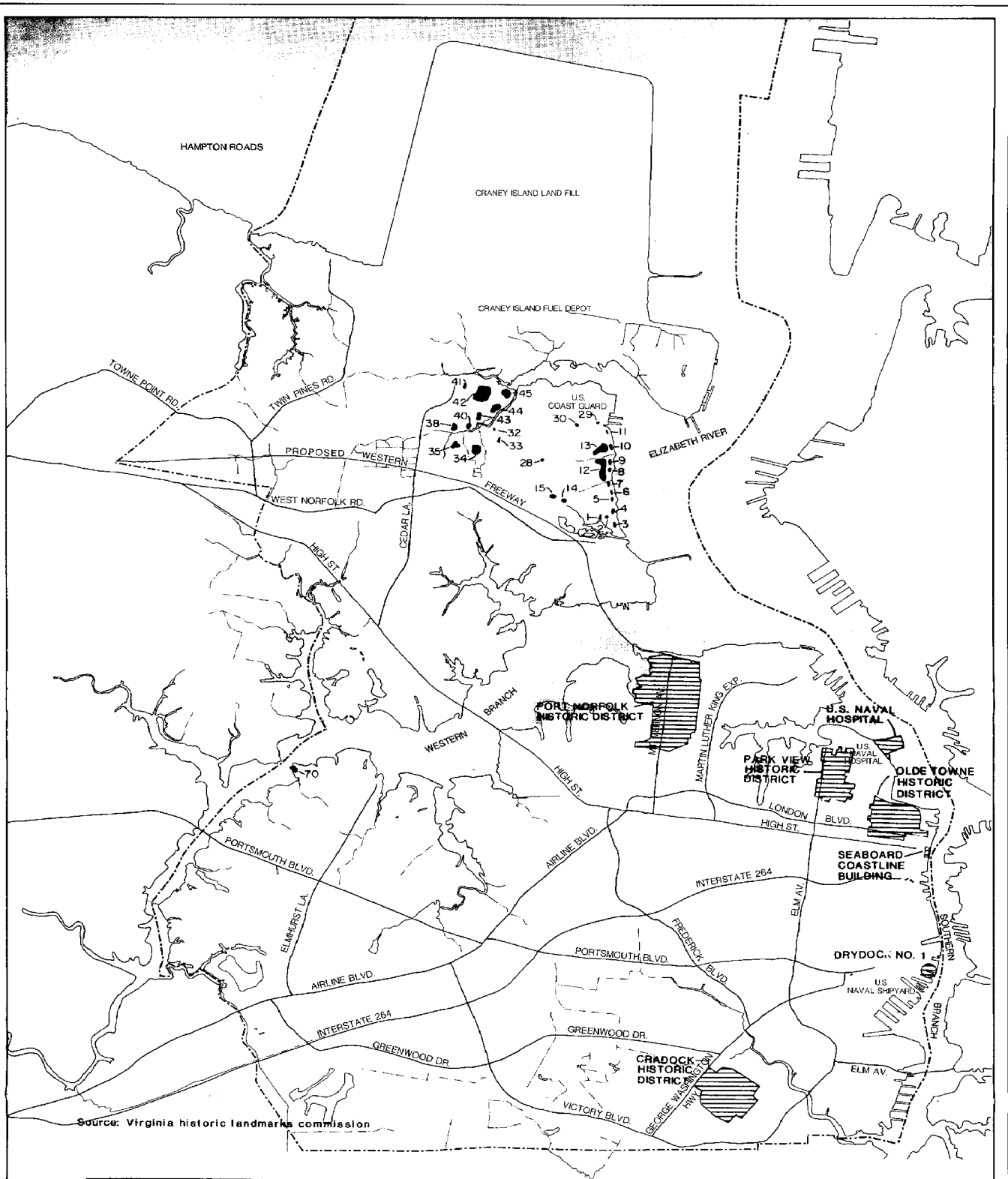
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CITY OF PORTSMOUTH, VIRGINIA



Figure 2-2 NATURAL RESOURCES LEGEND

-  Estuarine Emergent Wetlands*
 -  Nonvegetated Tidal Flats
 -  Fringe Marsh (2-20 feet wide)
 -  Public and Private Oyster Grounds (currently closed)
- *non-tidal wetlands not depicted



Source: Virginia historic landmarks commission

Portsmouth Virginia

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CITY OF PORTSMOUTH, VIRGINIA

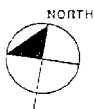


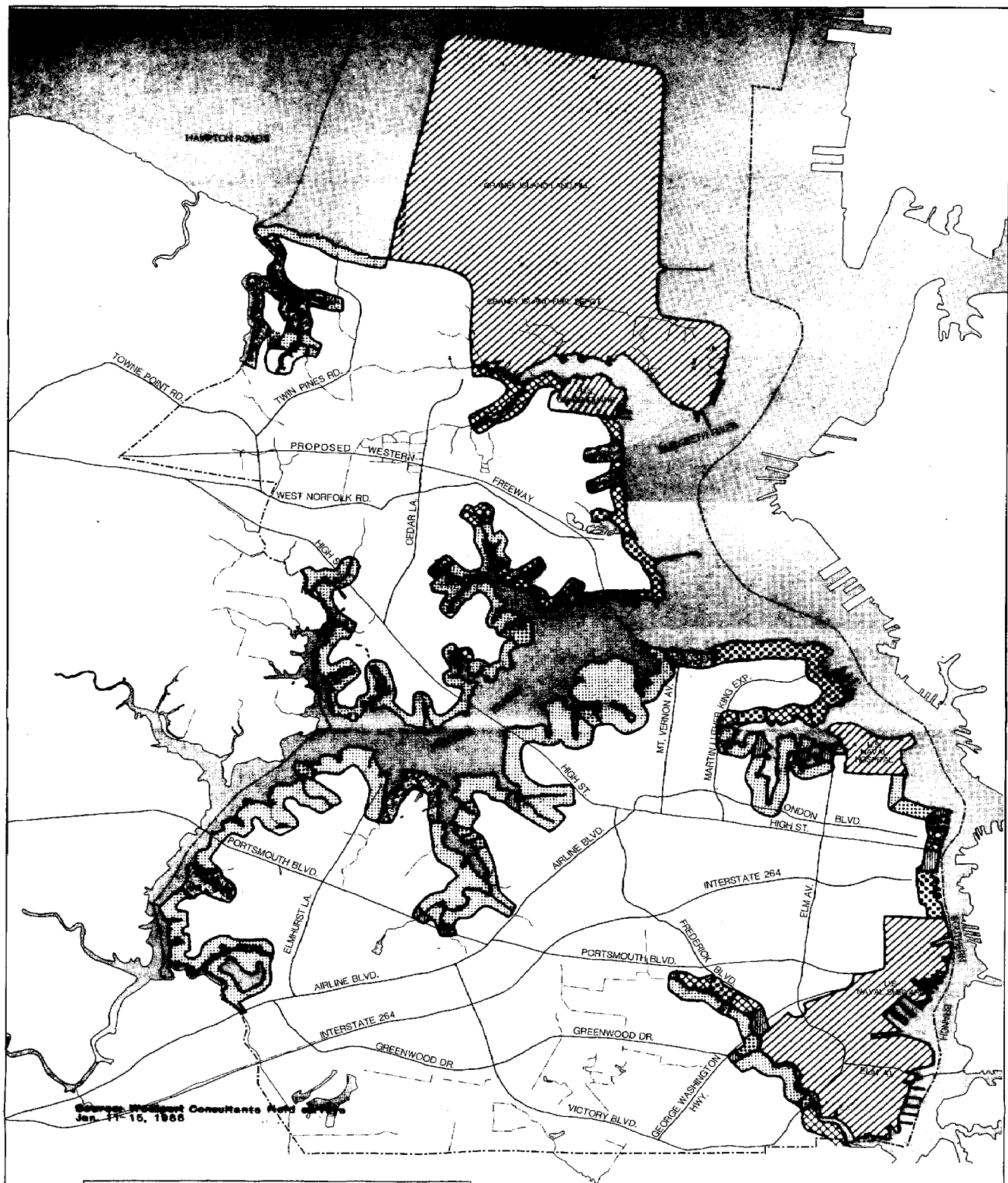
Figure 2-3

CULTURAL RESOURCES

LEGEND

● Known Archaeological Sites

▨ Historic Sites or Districts



Portsmouth Virginia

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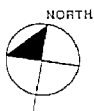
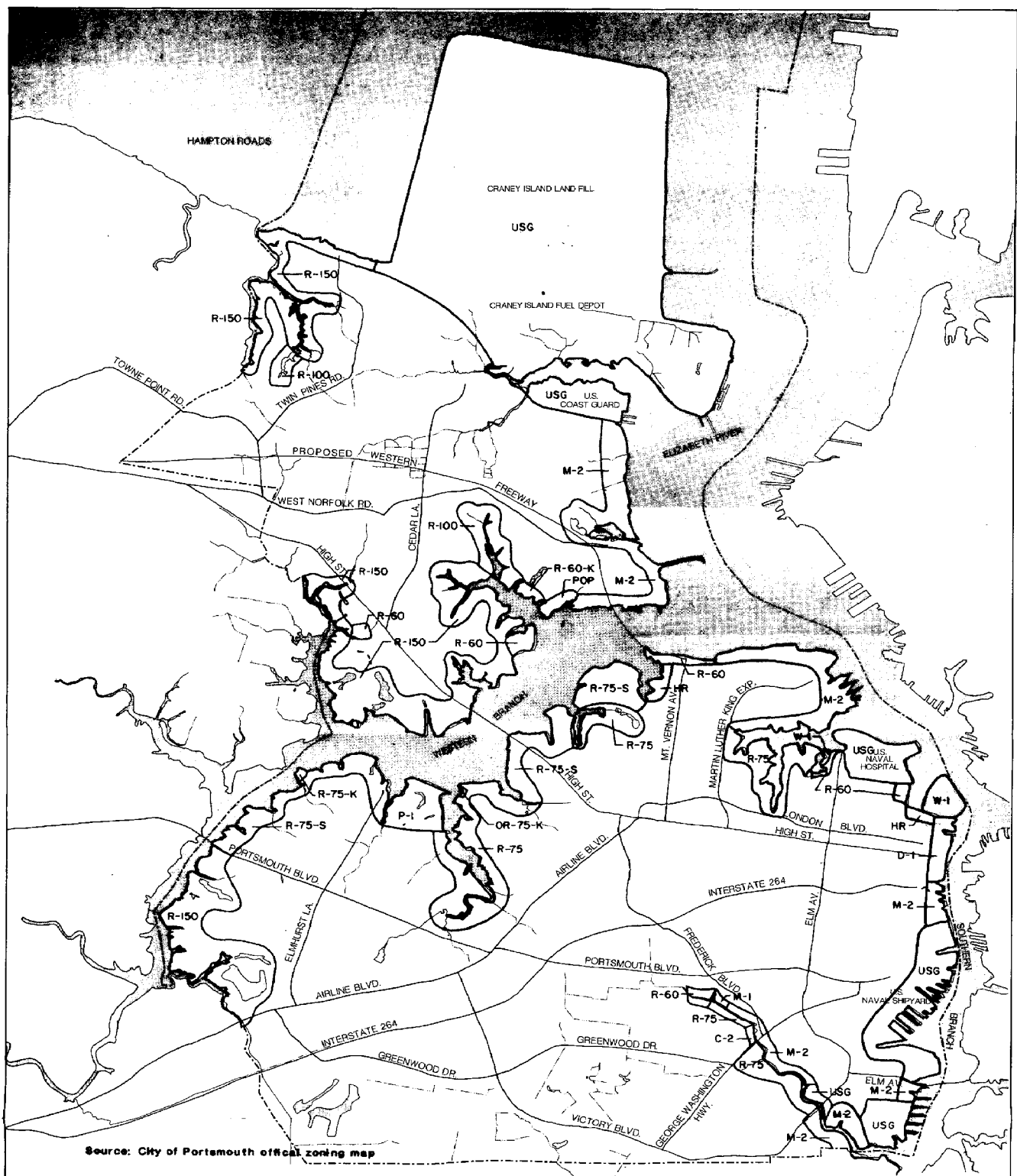


Figure 2-4
EXISTING LAND USE

LEGEND

- Single-Family Residential
- Multi-Family Residential
- Commercial/Office
- Industrial
- U.S. Government
- Parks/Open Space
- Vacant/Agricultural



Source: City of Portsmouth official zoning map

Portsmouth Virginia

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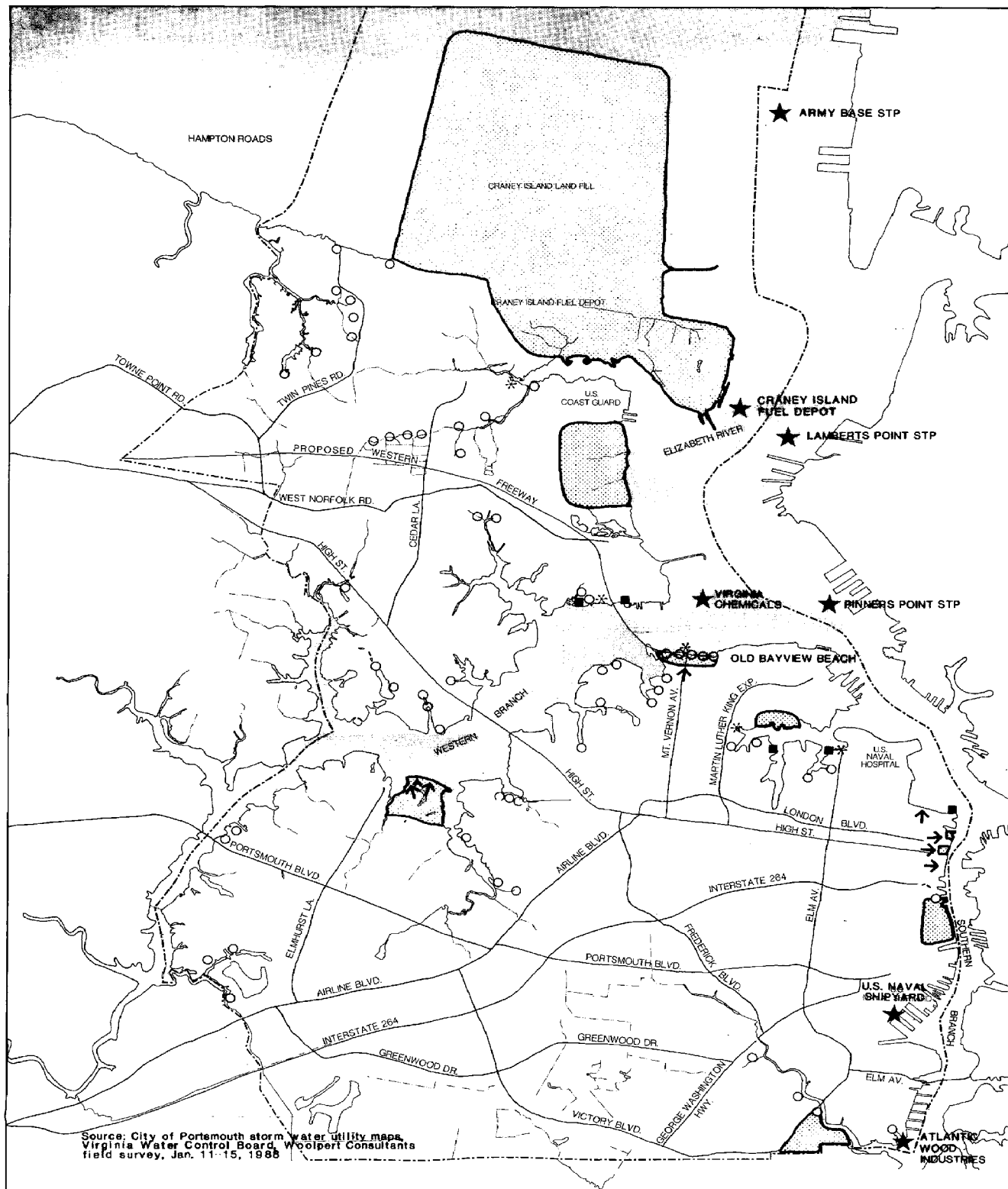
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Figure 2-5
EXISTING ZONING

LEGEND

- C-2 General Commercial
- D-1 Downtown District
- HR Historic Residential
- M-1 Limited Industrial
- M-2 General Industrial
- R-60 R-60 Residential, Med. Density
- R-75 R-75 Residential, Low Density
- R-75-S R-75-S Residential
- R-100 R-100 Residential, Low Density
- R-150 Suburban Residential
- OR-75-K Office/Residential, Low Density
- USG Military Reservation
- W-1 Waterfront, Res., Comm.
- P-1 Preservation
- POP Planned Office Park
- K Conditional Zoning



Portsmouth Virginia

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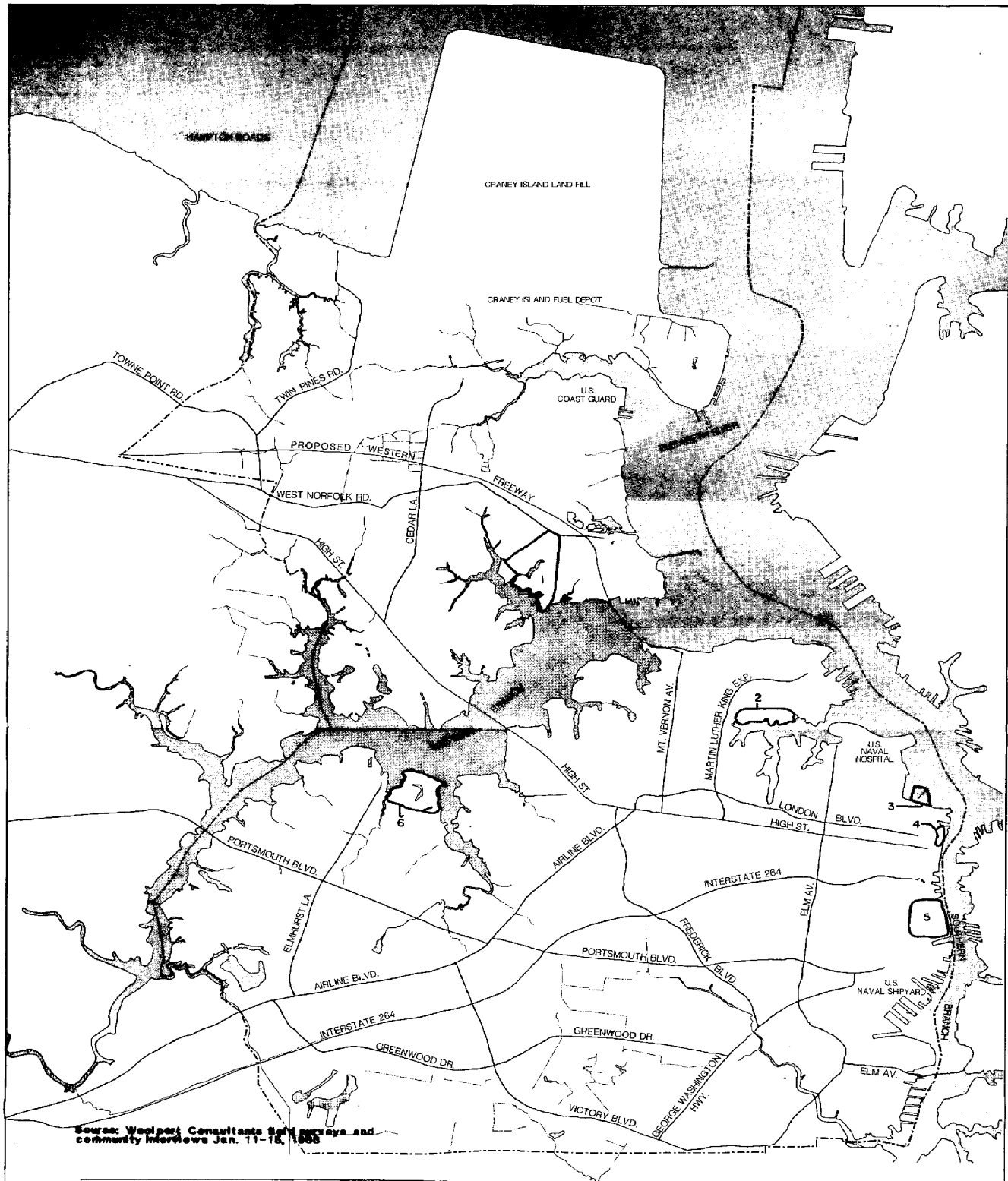
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Figure 2-6 BUILT ENVIRONMENT

LEGEND

- ▲ Existing Boat Ramps
- * Alternative Boat Ramps
- Marinas
- Economic Development Opportunity Areas
- ↑ Public Access Points
- Major Stormwater Outfalls & Box Culverts (24"-58")
- ★ Permitted NPDES Outflows



Portsmouth Virginia

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DEPARTMENT OF PLANNING
CITY OF PORTSMOUTH, VIRGINIA



Figure 2-7

PLANNED & PROPOSED DEVELOPMENT ACTIONS

LEGEND

- 1 River Pointe
- 2 Scotts Creek
- 3 Tidewater Yacht Agency
- 4 Downtown Developments
- 5 Old Coast Guard Site
- 6 City Park Restaurant

CHAPTER 3 COASTAL ZONE LAND USE PLAN

This chapter presents the concept rationale used to develop the Portsmouth Coastal Zone Land Use Plan and highlights areas of primary concern for preservation and development. The proposed land use plan is presented with accompanying utility, circulation and access considerations. Zoning and physical development strategies are presented to successfully execute and manage the plan.

I. SIGNIFICANT COASTAL LAND USE AREAS

Those areas along Portsmouth's coast that significantly relate to the issues, goals and rationale of this plan are referred to as significant Coastal Land Use Areas and are basically synonymous to the Geographic Areas of Particular Concern (GAPC) described in the VCRMP. These areas can be divided into two major types: environmentally sensitive areas and prime economic development areas (see Figure 3-1). In many cases, these two types overlap -- an area can be both environmentally sensitive and a prime economic development area. (Such areas are illustrated in Figure 3-1 by cross-hatching.) In these areas, future development requires innovative planning to balance the two concerns and provide optimal use of Portsmouth's coastal zone.

The priority of use recommendations for each GAPC is extracted from the VCRMP. These recommendations are given in order of consideration from highest to lowest priority and are advisory in nature.

SIGNIFICANT ENVIRONMENTALLY SENSITIVE AREAS

Productive Natural Resource Areas

Included here are resources vital to the productivity and stability of coastal ecosystems or to the human use and enjoyment of coastal resources. These resources are predominantly of state and national significance.

1. Wetlands

The alarming rate of disappearance of the wetlands (especially saltmarshes and tidal flats) has stimulated federal and state protective legislation. These wetlands are given a special GAPC designation based on their diverse values. Wetlands in Portsmouth are important contributors to two related GAPC

categories: spawning, nursery and feeding grounds; and wildlife management. The wetlands also buffer the negative effects of the two natural hazard area GAPCs (erosion and flooding) in Portsmouth.

Ranked priorities of use are:

- ° Preservation;
- ° Conservation;
- ° Recreation (hunting, fishing, fowling);
- ° Agriculture (grazing); and
- ° Development.

2. Spawning Nursery and Feeding Grounds

In addition to the wetlands, public oyster grounds are also included in this category. Restoration of water quality and vitality in the Elizabeth River is of prime importance to these areas. (Blue crab and striped bass spawning sanctuaries are not in the Study Area.)

Ranked priorities of use are:

- ° Conservation and restoration;
- ° Commercial and recreational fishing; and
- ° Development (dredging).

3. Coastal Primary Sand Dunes and Barrier Islands

Portsmouth's coastline is entirely composed of protected estuarine boundaries, so no primary sand dunes or barrier islands are located within the Study Area.

4. Significant Wildlife Habitat Areas

No managed wildlife areas are located along Portsmouth's coastline. The most significant habitat areas for wildlife are in the coastal wetlands (both saltmarsh and tidal flat wetlands).

5. Significant Public Recreation Areas

Most significant public recreation areas are established facilities such as City Park and historical sites, but potential development areas such as Bayview Beach may eventually be included. No state parks are presently located or planned along Portsmouth's shoreline.

Ranked priorities of use are:

- ° Recreation such as hunting, fishing, boating, golfing and picnics;
- ° Education;
- ° Conservation; and
- ° Preservation.

6. Sand and Gravel Resources

The watershed of Hoffler Creek has two fine-sand extraction operations. Tarmac-Lonestar, a large building-materials transport operation, is on the northwest corner of Pinners Point and holds a NPDES permit.

Ranked priorities of use are:

- ° Conservation and
- ° Development.

7. Underwater Historical Sites

No underwater historical sites are documented along Portsmouth's shoreline, but a number of upland archaeological sites and historical sites or districts deserve consideration.

Ranked priorities of use are:

- ° Preservation;
- ° Conservation;
- ° Recreation; and
- ° Development.

Natural Hazard Areas

These categories represent potential hazards to life or property in developed areas and create design constraints for any new construction.

1. Highly Erodible Areas

Many areas in the tidewater region have severe problems with shoreline erosion, but most soils along coastal areas are also sensitive to disturbance. Two areas in particular, Rivershore and the Cox Property, have had extensive erosion.

Ranked priorities of use are:

- ° Preservation;
- ° Conservation;
- ° Recreation; and
- ° Development.

2. Coastal High-Hazard Areas

This category concerns the vulnerability of coastal developments to the harmful effects of floods associated with tidal and storm events. Portsmouth lies in an area acutely susceptible to such effects. This GAPC, as defined by the 100-year (Intermediate Regional) flood plain, may be subjected to high velocity waters including hurricane wave wash and tidal waves.

Ranked priorities of use are:

- ° Preservation;
- ° Conservation;
- ° Recreation; and
- ° Development.

PRIME ECONOMIC DEVELOPMENT AREAS

This category is synonymous with Waterfront Development GAPCs. Waterfront development areas such as ports and community waterfronts are included in the VCRMP due to their economic and social values. These areas need to be managed because so few of them are available and these few receive heavy development pressure. This is also true of environmentally sensitive areas.

The VCRMP recognizes two classes of uses for waterfront development GAPCs. The first class, which is given top priority, is water-access dependent activities. The second class of uses is activities that are significantly enhanced by a waterfront location and are complementary to other existing and/or planned activities in a given waterfront area.

The Portsmouth shoreline has eight significant waterfront areas with a potential for economic development/redevelopment. These areas are shown in Figure 3-1.

Cox Property

This 600-acre site along the Main Branch of the Elizabeth River represents Portsmouth's last significant waterfront development opportunity area. This site is constrained by a tidal creek that penetrates the site and by substantial tidal flats all along the site's shoreline. However, with careful planning and environmentally sensitive design, this site could be developed as a significant deep-water port with mixed-use, light industrial and commercial uses along its upland portion.

Scotts Creek

Located at the zero-mile marker of the Intercoastal Waterway, Scotts Creek's north shore represents an opportunity to develop a marine-oriented mixed-use development. This market is relatively untapped in the tidewater area. Such a development would be compatible with the industrial uses of Pinners Point as well as with the residential uses on the south shore of Scotts Creek.

Craney Island Landfill

This area represents, at best, a very long-term economic development area. However, portions of the area could be developed as another site for large-scale marine industrial uses if the City can acquire the land and redevelop it.

West Norfolk Bridge Site

This site, currently underdeveloped, offers prime waterfront access to the Western Branch of the Elizabeth River. After the Western Freeway is completed, this site will be more visible, more accessible and attractive for redevelopment.

RiverPointe

This site is currently being developed as a large mixed-used office and residential community. Previously an agricultural use, this new development will significantly increase the intensity of land use. The proposed uses are not water-dependent, but the proximity of water to the site makes RiverPointe attractive.

Downtown Portsmouth

Downtown Portsmouth has two sites proposed to be redeveloped as office and commercial uses. These sites are not dependent upon the water for their economic viability, but proximity to the downtown business district and the water will make these sites attractive.

Old Coast Guard Site

The old Coast Guard site, south of downtown Portsmouth, offers a large redevelopment site with deep-water access. Future development plans do not specifically include water-dependent uses; the plans call for mixed office, commercial, residential and light industrial uses.

Paradise Creek

The Paradise Creek site offers a marginal opportunity for industrial development because the buildable area may not be large enough to attract larger developments. The physical unattractiveness of the site limits its development potential for other uses.

Ranked priorities of use are:

- ° Activities dependent on water access and
- ° Activities significantly enhanced by waterfront location and complementary to existing or planned activities in the same waterfront area.

II. COASTAL LAND USE PLAN

The recommended Coastal Land Use Plan is illustrated in Figure 3-2. This Plan allocates land uses along the Portsmouth shoreline, and it pays particular attention to areas currently undeveloped and to agricultural uses that will probably undergo a land use change in the next few years. The Plan identifies all environmentally sensitive lands in these areas and recommends compatible future land uses adjacent these sensitive areas.

RESIDENTIAL

Residential development will continue to be the dominant land use throughout coastal Portsmouth. New residential development is expected in the upper reaches of Carney Creek and Hoffler Creek. In these areas, new developments should be approximately 100 feet from the wetland areas, and care should be taken to design pre-construction and post-construction runoff control to avoid siltation in the tidal areas. Specific actions to mitigate siltation are described in the Environmental Management Strategies section of this report on page 107.

New residential development could also occur in mixed-use developments at RiverPointe and the old Coast Guard site. Care should be taken at RiverPointe to avoid wetlands, provide vegetated buffers around wetlands and control runoff to avoid siltation and non-point source pollution.

COMMERCIAL/OFFICE

Commercial and office development will be restricted to downtown Portsmouth and to mixed-use developments along the shoreline. Commercial or office development is likely in two redevelopment sites in downtown Portsmouth. Adjacent downtown (on the old Coast Guard site) commercial/office uses could make up a large segment of this mixed-use development.

Other mixed-use developments at RiverPointe and on the north shore of Scotts Creek will also provide additional commercial/office uses along the shoreline. The Scotts Creek development will mix various commercial and smaller industrial, marine-related uses. RiverPointe will mix office and residential uses.

A final area of possible commercial/office development is on the west edge of the Cox Property. Although water-dependent industrial uses are planned for part of the shoreline, the west portion could be used for commercial/office development. Access by way of the proposed Western Freeway will make this an attractive location.

INDUSTRIAL

Industrial development represents a significant future land use of coastal Portsmouth. Existing industrial areas around the Naval Shipyard on Pinners Point and in the West Norfolk Section will be maintained. The largest new industrial area may be the Cox Property.

Although the Cox Property offers an excellent site for a water-related industry, it is constrained by Lake Kingman, an unnamed tidal creek, archaeological sites and tidal flats. Wetland areas should be protected by a buffer of 100 to 200 feet around them. The archaeological sites can be surveyed and excavated, if appropriate, before construction. The remaining environmental constraint -- the tidal flats -- is not so easily resolved. Deep-water access is impossible at this site without removing some tidal flats by dredging. This Plan proposes a compromise by designating one section of the tidal flats for dredging a deep-water channel. Development to other areas would be restricted to leave the remaining tidal flats unaffected. Regrading and revegetation of the eroded bluffs on this property would be appropriate for erosion control, aesthetics and site stability when the area is developed.

Future industrial development is also likely west of the West Norfolk Bridge and along the north shore of Scotts Creek. These areas are likely to be mixed-use developments that combine commercial/office and industrial uses.

A final, long-term industrial development is recommended for the eastern third of the Craney Island Landfill. This area is not likely to be available for development for at least 25 years. Future ownership of this site is unknown at this time.

GOVERNMENT

The U.S. Government is not expected to expand its land uses in the near future, but it may intensify its existing uses. Increased use could have such environmental impacts as increased stormwater runoff, which would increase non-point source pollution, siltation and erosion. In the long term, governmental uses may be reduced with the redevelopment of the Craney Island Landfill. However, another federal agency is likely to acquire this property after the U.S. Army Corps of Engineers relinquishes it.

RECREATION

Recreational uses along the Portsmouth shoreline include both public and private parks, public boat ramps and public boat slips. The Coastal Land Use Plan recommends the maintenance of City Park as the City's main water-related recreation area. A new park at Bayview Beach would provide needed public access to the water with unique views of the nearby industrial waterfronts. Another public access waterfront park is proposed at the Cox Property tidal creek. This recreational opportunity is described more fully in the next section.

Although the need for additional public boat ramps has not been definitely determined, the Portsmouth area has several possible locations for ramps. The West Norfolk Bridge site, Scotts Creek and Paradise Creek offer short-term sites, and Craney Island offers a long-term site for public boat ramps and recreational facilities.

The Elizabeth Manor Country Club and several private marina and boat slips provide additional recreational opportunities for Portsmouth's citizens.

OPEN SPACE

Open space areas are recommended for all undeveloped areas within 200 feet of a wetland area. This is usually the maximum buffer needed to preserve the wetland area and mitigate any adverse impacts from new development. Areas in which this buffer should be established include all of Hoffler Creek and Craney Creek, the undeveloped areas of Carney Creek and Lake Kingman and the Cox Property tidal creek.

The Cox Property tidal creek provides public access to two distinctly different "working waterfronts." Through the use of elevated walkways and landings, people will be able to see the natural "working waterfront," a complex ecosystem. With strategically located signage that explains what is observed, this area could become an educational tool for enlightening visitors to the crucial functions wetland areas perform. The walkways could be extended out into the Elizabeth River to provide visitors with a view of the industrial "working waterfront" that surrounds the area. This unique grouping of the two contrasting yet complementary "working waterfronts" would also attract tourists, which would help the City's tax base.

The City does not own this property. A possible solution would be for the property owner to donate this section of the property to a non-profit land trust such as an entity established through the Trust for Public Lands. The trust could develop and manage the property in conjunction with other interests. The property owner would receive tax benefits and favorable public relations in return.

ZONING AND RELATED DEVELOPMENT CONTROLS

An important element of the CZLU Plan and its implementation is the incorporation of the recommendations and environmental controls into Portsmouth's codified ordinances. The land use control techniques discussed below are designed to make land use regulations in Portsmouth more responsive to environmental issues and shoreline protection concerns. Any land development potentially creates point source and non-point source pollution, sedimentation and erosion and degradation of the shoreline environment. These phenomena can be controlled to varying degrees by appropriate development controls.

Development controls that regulate new development, particularly projects near the shoreline, can have a significant impact on coastal zone quality. The problems of coastal zone quality -- point and non-point source pollution, erosion and sedimentation -- can be mitigated by regulating the way development occurs. The Shoreline overlay zone and the W-2 Working Waterfront District are suggested methods to better control new development on limited vacant parcels in the community. Further mitigation can be achieved through review of proposed projects by the Wetlands Board.

Portsmouth is a mature community with a largely developed coastal zone. Methods for regulating the redevelopment and continued use of the residential and commercial parts of the coastal zone are a vital part of the Coastal Zone Management Plan. The techniques discussed again in the shoreline overlay zone and in the modifications to the existing zoning code are important elements to change the impact of existing development on environmental quality.

Because much of the coastline is already developed, the impact of these modifications will be gradual. In the long-term, however, improving areas already developed can have a more significant positive impact on coastal quality than the regulation of limited vacant property. These redevelopment recommendations will control the intensification of land use in desirable waterfront developments -- such as adding paved tennis courts to residential properties or paving a landscaped area to provide more parking for a commercial property. Local government should consider the following techniques for regulating development that may cause environmental concerns.

Zoning Techniques

A Shoreline Overlay Zone is an option for all coastal frontage in Portsmouth except for public property and special coastal zones. The Shoreline Overlay Zone would be designated for all shore areas, regardless of the base district zoning. The Shoreline Overlay Zone should not change the original zoning designation on property, but it

could apply additional requirements to permitted development in a base zoning district. The designation would apply to all land with a shoreline boundary and would extend 200 feet inside the shoreline, measured from the mean high water mark. The following criteria could apply to all development or land use in a Shoreline Overlay Zone.

- ° Structures (excluding private docks) should maintain a setback of 100 feet from the mean high water mark.
- ° Natural upland vegetation buffer areas in setback areas should be maintained as much as possible within the Shoreline Overlay Zone and should be maintained in any case where construction requires removal of vegetation. As soon as is possible, the area should be revegetated within a construction easement to at least 75 percent of the original vegetated cover. Vegetation loss should be compensated for with water and sediment control structures.
- ° Agricultural uses, including keeping animals, should be prohibited within a Shoreline Overlay Zone.
- ° The storage of hazardous materials should be prohibited within a Shoreline Overlay Zone.
- ° Public access to the shoreline should be provided from all existing public rights-of-way extending into a Shoreline Overlay Zone. Where public rights-of-way are not present, public easements should be required at regular intervals of approximately 1,000 feet.

The above criteria are intended to protect the Portsmouth shoreline from the potentially negative impacts of development by mitigating shoreline erosion and sedimentation problems, controlling potential pollution and allowing reasonable public use of the shoreline.

These concepts are similar to the special regulations that protect Portsmouth's historic resources and could be positioned in the zoning code with these existing regulations.

An alternative to creating a Shoreline Overlay Zone would be to provide additional regulations in each zoning district that would apply to development or redevelopment in coastal areas of that zone. The effect of this type of regulation would be similar to the shoreline overlay, but would require more extensive modification to the zoning code.

Both the existing and the proposed zoning codes provide for two waterfront zones, the P-1 Preservation District and the W-1 Waterfront District. The P-1 District is intended to preserve open space and environmentally sensitive areas of Portsmouth. Currently, the only P-1 designation is the City Park area. This designation

should be applied more aggressively in other environmentally sensitive areas, particularly in remaining saltmarsh and tidal flat areas such as Hoffer Creek and the Cox Property Flats. The W-1 Waterfront District provides for mixed-use developments that use the waterfront for commercial, residential and recreational uses. This district may be termed the W-1 Mixed-Use Waterfront District, as to distinguish it from the proposed new W-2 Working Waterfront District.

A new W-2 Working Waterfront District is proposed to provide for shoreline areas to be used by water-dependent commercial and industrial uses. Permitted uses would be uses dependent on deep-water port facilities and/or direct access to the waterfront. The following uses, referenced with Standard Industrial Classification (SIC) codes, as in the proposed zoning code, illustrate appropriate types of permitted uses in this district: Marine Supply Dealer (5551), Ferry Terminal (4230), Tour Boat Landing (4459), Ship and Boat Building and Repair (3730). These more intense water-related uses, such as industrial deep-water ports, are not entirely compatible with the mixed-use types of developments appropriate in the W-1 District and should be encouraged but distinguished from uses in the W-1 District.

The dimension requirements in the W-2 District should allow flexibility, with no front yard or side yard setbacks or buffering requirements at the rear lot lines adjacent residential and commercial uses. Buffer zones related to coastal environmental protection would still be required.

Further regulating uses in the W-2 District would be appropriate, based on performance criteria that consider the potential risks of industrial pollution and mitigating industrial land use problems in a complex urban system such as Portsmouth. Suggested performance standards are included in the Appendices.

Land use in the W-2 District should be further guided by the Wetlands Board. Permits that ensure compliance with relevant regulations will further safeguard coastal areas used for commercial and industrial purposes.

The W-1 and the proposed W-2 districts are intended to provide space along the shoreline for water-related and water-enhanced uses in a way that protects the shoreline.

The Shoreline Overlay Zone should not be imposed on the P-1, W-1 or W-2 Districts. These districts would have shoreline protective measures in their district regulations and would be subject to permitting of shoreline alterations through the Virginia Marine Resources Commission, U.S. Army Corps of Engineers and Portsmouth Wetlands Board.

In addition to the changes recommended above, several other modifications to the zoning code would have a positive impact on the coastal environment that over the long term. Many of these issues have been addressed in the proposed zoning code the City is now reviewing. These issues include:

- ° Agricultural practices and the keeping of livestock have a potentially negative impact on the coastal environment, due primarily to non-point source pollution carried in storm runoff, erosion and sedimentation. Agricultural uses, including the keeping of animals, should be prohibited in residential districts, with the exception of the R-150 District.
- ° The amount of pavement and impervious surfaces in the City increases the volume of non-point source pollution in stormwater runoff. Sedimentation and erosion accompany altered runoff conditions. The proposed lot coverage maximums in the zoning ordinance under review should improve this situation. It is further recommended that lot coverage be defined as any coverage of the ground by an impervious surface, including sidewalks, driveways, parking areas and swimming pools.
- ° Industrial uses in the M-1 and M-2 Districts are very broadly defined, making the tracking of point source pollution difficult. A more detailed outline of industrial uses in the proposed ordinance and the overlay zone would make it easier for the City to regulate potential pollution sources.

Tax Incentive Controls

A number of other strategies for protecting and preserving the coastal zone are related to voluntary agreements under the incentive of property tax relief. These benefits can be realized through public or private donations and acquisition, conservation easements or deed restrictions, land management under a land trust, or other real estate tax incentives as allowed by law. (See Appendix C: Coastal Zone Management Funding Source, Non-profit Organizations, for more information).

The Portsmouth Wetland Board

The Portsmouth Wetland Board should consist of individuals knowledgeable in planning, biology, hydrology, water quality, soil science, engineering, economics and the permit criteria for the U.S. Army Corps of Engineers and the Virginia Marine Resources Commission. The Commonwealth of Virginia should be solicited to provide adequate training, financial assistance and technical assistance as needed. A comprehensive procedural and technical manual produced at the state level would also be helpful.

Some particular focuses of the Board should include:

- ° Requiring all construction plans to be reviewed for wetland (tidal or non-tidal) involvement, redesigned if necessary and properly permitted before any construction can begin.
- ° Considering cumulative losses of small permitted fills against the total local, regional and state inventory of various wetland types. Piecemeal permission of wetland fills creates significant losses to the ecosystem over time. Granting such permission has recently produced large losses of saltmarsh and tidal flats statewide.
- ° Taking a strong stand on wetland preservation in preference to allowing destruction. The underlying rationale to this strategy is that the public and private benefits of the wetlands often outweigh any benefits associated with their loss; construction and maintenance costs are higher on wetlands; innovative construction design alternatives to wetland encroachment often exist; and successful wetland restorations are expensive and seldom match the quality and function of the original wetland.
- ° Establishing a strong rapport with City and community leaders and the public at large. This can be accomplished through education, complete public access to review permits and a coordinated public relations plan. Such support is vital to the effectiveness of Board actions.
- ° Initiating a continuing program of public awareness of wetlands and coastal environments, their importance to the local economy and regional ecosystem and the impact that incompatible construction methods can have on wetland and coastal vitality.

The Portsmouth Wetland Board should assume primary responsibility for wetland protection issues concerning land use decisions throughout the coastal zone, including zoning districts P-1, W-1 and W-2. The Board should be granted the powers necessary to execute that responsibility. This Board could issue wetlands permits for development and other activities requiring permits in the P-1, W-1 and proposed W-2 districts. This process of limited zoning review would be similar to the process used by the Commission of architectural review.

III. INFRASTRUCTURE AND CIRCULATION REQUIREMENTS

This section outlines what infrastructure (storm and sanitary sewers, water supply and electricity) and circulation (streets and roads) improvements will be needed to achieve the recommended Coastal Land Use Plan.

STORM SEWERS

Storm sewer systems will be needed in any new development along the shoreline. The increased stormwater runoff that occurs when impervious surfaces such as asphalt and concrete replace natural open areas needs to be collected and dispersed into the natural drainage system at a flow-level comparable to predevelopment conditions. This may require the use of retention or detention basins near large developments that have large amounts of paved surfaces.

SANITARY SEWERS

As with storm sewers, all new developments along the shoreline will need to be serviced by sanitary sewers. Most of the currently undeveloped land can be easily tied into the existing sanitary sewer system.

Development of an industrial at the Cox Property that produced large amounts of effluent might require larger sanitary sewer lines to accommodate the increased flow.

WATER SUPPLY

The water supply is crucial for residential uses such as drinking and bathing and for industrial uses during the manufacturing process, and it is also needed for fire protection. Water lines to new developments must be large enough to ensure adequate water pressure to meet all these needs.

If water is to be used by a new industrial development as a coolant in a manufacturing process, care must be taken not to discharge any heated water that could cause thermal pollution.

ELECTRICITY

The electric system could be extended into all of the undeveloped shoreline areas. At those sites that are adjacent environmentally sensitive areas, electrical lines should be put underground (but not within wetlands) to preserve the natural aesthetics of the area.

Any large scale development that needs large amounts of electricity to operate may require an upgrade of the electrical system to meet the demand. Another option at the Cox Property would be to purchase either steam or electricity from the COGENTRIX plant.

ROADWAYS

Many of the undeveloped areas are currently inaccessible or have poor access to the major thoroughfares of the City. Access roadways will need to be constructed before these areas can be developed. All roadways in coastal areas should be planned and designed to avoid environmental degradation through increased stormwater runoff and improper culvertizing and filling. Development of the Cox Property will require an entrance road to provide access to the Cox Property shoreline and an access road (running parallel with the Western Freeway) from one of the proposed interchanges to the entrance road.

Access to the north shore of Scotts Creek will be limited until an interchange from the Martin Luther King Expressway is constructed. It is uncertain at this time how the interchange will be designed or how the Scotts Creek site will be tied into the existing limited access network.

Access to other undeveloped areas can be easily improved by construction of "feeder" streets into these areas. If a proposed roadway must cross over a wetland area, a bridge over the wetland area must be constructed. The use of a culvert and fill, while less expensive than a bridge, would essentially destroy the wetland and its attendant functions.

IV. COASTAL ACCESS STRATEGY

The Coastal Access Strategy is designed to make the Portsmouth shoreline more accessible to the public. Currently, only one public location has boat launching facilities, and only a few public places provide a view of the water. The Coastal Access Strategy recommends ways to improve public access to the waterfront. These recommendations are illustrated in Figure 3-3 and outlined below.

PUBLIC BOAT RAMPS

Portsmouth's only public boat ramps are in City Park. These ramps are centrally located on the Western Branch, but they are far from fishing and water skiing areas. Public boat ramps closer to the Main Branch of the Elizabeth River or on the Southern Branch would place boaters nearer their ultimate destination.

Before selecting sites for additional public boat ramps, the City should determine whether additional public boat ramps are needed. Many citizens have private docks adjacent their property; other citizens have access to an increasing number of private boat slips; and owners of trailered boats do not need ramps because they can easily transport their boats to other areas to be launched.

Five sites throughout Portsmouth were analyzed as potential sites for additional boat ramps.

1. City Park

City Park is centrally located, the property is owned by the City, and access to the site would not cause any additional disruption of adjacent neighborhoods. This location, however, is not near many fishing and water skiing areas.

2. West of West Norfolk Bridge

This site would provide boat ramps near the growing population of the Churchland, Hatton Point and Merrifields neighborhoods. Access to this location would be excellent due to its proximity to the proposed Western Freeway, and the additional traffic would not further disrupt any adjacent neighborhoods. This site would allow boaters to launch near the mouth of the Western Branch with easy access to the rest of Hampton Roads. This site, however, is currently owned by multiple property owners, some of whom have specific plans for developing their properties. Using this site might deter future commercial or industrial development at this site.

3. Scotts Creek

Constructing new boat ramps on City-owned land on the western shore of Scotts Creek would give boaters access to the northern section of the Southern Branch. Access to this site is currently poor, but it should improve after improvements are made to the Martin Luther King Expressway and approved dredging of the Creek is completed. However, some people may use local streets to gain access to the site and disrupt adjacent neighborhoods. This site may not have enough landside area to accommodate support facilities such as parking and restrooms. Increased boat traffic on this waterway could also cause congestion if the north side of the Creek is developed as planned.

4. Paradise Creek

This privately owned area is in the extreme southeast corner of the City, but it has direct access from Interstate 264 by Victory Boulevard, and it would serve the citizens of the southeastern neighborhoods. This site would allow boaters to launch their boats near the Southern Branch, south of the heavy ship traffic of the Naval Shipyard, but boaters would have to navigate through the heavy ship area to get to Hampton Roads. This site would also allow water skiers to launch their boats closer to the areas where they prefer to ski. Some dredging and wetland removal would be needed to deepen the channel for launching activity.

5. Craney Island

This site, in the extreme northern section of Portsmouth, would allow boaters to launch directly out into Hampton Roads. This site, however, is a long-shot at best because there is no public access to this area and any development plans are long-term.

The existing sail boat ramp at City Park is inadequate for the launching of sailboats larger than 15 feet because of the shallow draft adjacent the ramp. This facility would need to have somewhat deep water to facilitate the insertion of the boats' center board prior to sailing. Potential sites include the existing City Park site (with channel improvements), the West Norfolk Bridge site and, in the long term, Craney Island.

PUBLIC VIEWS AND VISTAS

Currently, the public has access to two improved areas with waterfront views. The first area is City Park, and the second is the downtown seawall. One unimproved area, Bayview Beach, also allows the public some waterfront views. Figure 3-3 shows other areas recommended for development as public access parks. The recommended areas are described below.

1. Cox Property Tidal Creek

As described earlier, the Cox Property Tidal Creek offers an excellent opportunity for the development of a public park. Walkways could provide elevated views of two "working waterfronts," with informational signage for public education. This site would also provide views of the Portsmouth Marine Terminal, Virginia Chemical Complex, Coast Guard Base, and the Norfolk Marine Terminal.

2. West Norfolk Bridge Site

This location provides a 180-degree view of the Western Branch. If a public boat launching facility is constructed here, a public-access park should be developed, with picnic tables, grills and benches.

3. Bayview Beach

This location provides views of the Portsmouth Marine Terminal, Virginia Chemical Complex and the Main Branch to Hampton Roads. With benches, tables and grills, this site could become an excellent public-access park. This site, however, may be severely constrained by the proximity of the Western Freeway connection to the Martin Luther King Expressway.

4. High Street Bridge Site

A small, publicly-owned parcel south of the western end of the High Street Bridge could be used to provide public access to the Western Branch. Ideally, development would be limited to a few benches to avoid disturbing the residential character of the adjacent neighborhood. This site could provide a resting point for people out for evening strolls and would be a quiet place from which to watch the water.

5. Scotts Creek

This site would offer views up Scotts Creek and would most likely be used by neighborhood residents. If a public boat launching facility is constructed here, a public-access park should also be developed.

6. Leckie Street Bridge

This bridge, currently closed to vehicular traffic, offers nearly 360-degree views of this branch of Scotts Creek. If the bridge remains closed, this location should continue to be a public-access point for viewing the water and participating in water-related activities. A lack of parking limits this site to neighborhood use.

7. Paradise Creek Site

Because of the industrial nature of this area, this site would provide unique views but would not be a likely picnic spot. If a public boat launching facility is constructed here, a public-access park should also be constructed.

8. Downtown Portsmouth

The existing public access by the seawall could be enhanced by informational signage. People looking across the river towards Norfolk would enjoy knowing more about the view and the history of the area. The seawall could become part of a walking tour stretching from the Naval Hospital, through Olde Towne, along the seawall and ending at the Naval Shipyard.

9. Neighborhood Access Points

City streets that dead-end at the waterfront could be developed as neighborhood access points. These areas could be cleared, and park benches could be installed to allow residents to sit and enjoy the proximity to the water. Clearing, cleaning and scheduled maintenance could be done by neighborhood and community service groups.

10. Craney Island

This site would offer excellent views of the Hampton Roads. However, as previously mentioned, this site is a long-term alternative.

PRIVATE BOAT DOCKS

Many residents have access to the water by private boat docks. Other homeowners have "mud-front" property because their waterfront property has silted in. These property owners would like their access to the water returned, but the U.S. Army Corps of Engineers is unlikely to permit this type of dredging. Even if the U.S. Army Corps of Engineers permitted dredging, the permissible channel width, if constructed with stable slopes, would have a draft of only four feet. The channel might quickly fill back in with a combination of upland erosion and tidal drift.

V. ENVIRONMENTAL MANAGEMENT STRATEGIES

The Coastal Land Use Plan segment of this chapter discussed zoning, tax incentive and administrative techniques for environmental management of coastal zones. This section focuses on construction and engineering considerations that can be implemented to optimize both the use and conservation of various coastal resources. Many of the strategies directly related to the wetlands have been drawn from the Virginia Marine Resources Commission criteria for evaluating alterations of wetlands.

Although the recommended strategies are grouped into resource categories parallel to those used in Chapter 2, most of the strategies provide benefits for more than one element of coastal resources. For example, control of aesthetic pollutants such as solid wastes, soap scum, oil and grease increases boating enjoyment. Control of toxic pollutants creates a greater interest in fishing. Sediment control and habitat management encourages shell and fin fish production. The implementation of interrelated strategies will, thus, create a total benefit (a revitalized recreational fishery) greater than the sum of the benefits of each strategy.

GENERAL LAND USE

1. Design all site plans around streamside vegetation, wetlands and shallow river areas to minimize filling, dredging or drainage alterations. Such designs can have the secondary benefits of providing green space, increased property values and tax exemption incentives.
2. Design all future utility lines and roadways to optimize community service and environmental fit. Avoid designing roads and distribution lines that cross over waterways or wetlands.
3. Limit shoreline alteration to water-dependent uses with proven economic justification and minimal adverse impact on the environment.
4. Avoid high-density development in or adjacent flood plains and wetlands. The existing downtown shoreline is an exception.
5. Design all permitted channels, earthwork structures and buildings in the coastal zone to withstand the stresses of the maritime environment. This will minimize the economic and environmental costs of frequent maintenance dredging and structural repair.
6. Dispose of dredge material in constructive ways by using it to restore fringe marsh, create buffer islands, provide fill for upland construction, fill mine pits or caverns, and regrade eroded bluffs.

7. Design stormwater management systems to control runoff quantity, velocity and direction to protect the public health, property and environment from adverse impact.

HYDROLOGY

The first six strategies address upland drainage control and dredge spoil disposal.

1. Design coastal zone construction plans to minimize the creation of impermeable surfaces: limit pavements, roadways and buildings to essential amounts and use permeable asphalt and pervious pavers where practical.
2. Incorporate appropriate transport, detention and infiltration structures into a coordinated stormwater management system to minimize outflow and surcharging (backwater).
3. Reduce the velocity and volume of runoff by directing runoff from impermeable surfaces to grassed swales, terraces and buffer strips. This practice will reduce high-volume fluctuations in subsequent storm sewers and retention/detention structures, improve runoff water quality and decrease erosion. A study in the Lynnhaven Bay area documented that runoff water from residential areas served by grassed swales had 30 to 90 percent less nutrients, sediment and biochemical oxygen demand than runoff from areas served by conventional curb and gutter systems.
4. Design runoff discharge management systems to maintain predevelopment discharge volume. The following three structures can improve stormwater management conditions by greatly reducing water volumes transported off-site and by removing sediment and pollutants from that water.
 - ° Infiltration Trenches (Figure 3-4) -- These are best suited to areas with permeable soils (most Portsmouth areas) but are limited by high water tables (some Portsmouth areas). Infiltration trenches are best suited to moderate density development in areas with limited space for detention structures. Oyster shell is the preferred backfill because it allows 100 percent more water flow-through than aggregate. Some designs may eliminate the holding box (to reduce cost) and use complete backfill with oyster shell. These trenches require larger holding dimensions. Depth, width and length of trenches may be modified to fit site designs.

- ° Dry Wells -- These are modified infiltration trench designs that can be installed at storm-drain catch basins in the stormwater transport network.
 - ° Wet Retention Ponds (Figure 3-5) -- These structures are suitable to all soil and water conditions in Portsmouth and to all land use densities. Wet retention ponds are most appropriate in high impervious surface/high volume runoff situations. They are more expensive than infiltration devices. Wet retention ponds provide an open-water amenity to site developments, but care must be taken to site them for hydrologic rather than aesthetic reasons to avoid potential ineffectiveness and flooding problems. Sediment trapping efficiencies usually range from 50 to 75 percent but can be greater than 90 percent in vegetated ponds. Because of the high permeability of Portsmouth soils, retention basins should be impounded where possible or lined with clay in areas of low water tables.
5. Locate disposal areas for dredge material from bucket or dragline spoil at least 15 feet upland of marsh areas. The disposal areas should be confined by vegetated earthen berms with stable, 30 to 40 degree slopes. The top elevation of the berm should be three to four feet above spring tide height, with internal release pipes near the top.
 6. Locate disposal areas for dredge material from hydraulic spoil 100 feet upland of the shore. Depth and distance between dredge slurry inflow and discharge pipes should be sufficient to ensure outfall water standards.

The following five hydrology strategies are concerned with managing natural drainage features of the Elizabeth River and connecting tidal creeks.

1. Avoid any change in the coastal water basin that reduces water circulation within or water flow into the estuarine system.
2. Keep natural upland drainage ways and tidal creeks unobstructed where possible. Maintaining drainage and tidal flushing generally decreases flood potential, erosion, pollution concentration and sediment plugging of stormwater outflows while preserving the productivity of aquatic habitats.
3. Design culvert transport for at least a 10-year storm flow from the connecting watershed for crossings or coverage of small upland drainages. Avoid culvert and fill construction when road crossings of larger tidal drainages are essential. Instead, use driven-pile or prestressed concrete deck unit bridges. These practices will minimize or eliminate fill in drainages and wetlands while maintaining site hydrology and soil stability.

4. Design marinas to maximize water circulation. Strategies include: locating marinas in areas with good preconstruction flush, maintaining shallow water areas near shore to accelerate tidal velocities in these confined areas, using floating docks and off-shore mooring where possible and avoiding fill in open water areas. Specific criteria recommended by the MRC to achieve these objectives include: siting marinas near the mouth of slow moving tidal creeks rather than the headwaters, structures should encroach no more than one-third the distance across the waterway, locate slips for deep draft vessels in the naturally deeper waters of the marina and designing any necessary breakwaters to minimize water circulation impedance by using floating tire or other non-permanent designs.
5. Avoid water stagnation and sedimentation problems when a channel cut into marsh or upland is permitted: make channels gradually shallower towards their inland extent, grade the slopes to 30 or 40 percent, revegetate the slopes and avoid narrow or angular designs.

WATER QUALITY

1. Upgrade Pinner's Point sewage treatment plant to tertiary treatment with bacteriological nutrient digestion under the control of the Hampton Roads Sanitation District.
2. Site marinas as far as possible from productive oyster or clam grounds because a bacterial contamination hazard accompanies the maintenance of on-board sanitary sewer facilities.
3. Apply chemical treatment processes to industrial wastewater effluents before discharge to remove specific heavy metals and organic toxins.
4. Initiate a comprehensive public education program to reduce loads of fertilizers, toxic household chemicals, and automotive fluids into storm and sewer systems serving residential areas. Reduction of overfertilization has reached 50 percent under such programs.
5. Survey maintenance of existing residential and marina septic systems and correct any seepage problems.

6. Require reasonable control of fertilizer use on remaining agricultural lands: spring application of fertilizers, no-till or contour plowing, and strip or terrace cropping. These practices reduce chemical outflow into the marsh-marine system and improve hydrology and erosion conditions. Apply vegetation buffer strips to agricultural areas as well as on erodible bluffs such as Cox Property, grassed swales and retention ponds near the coast. Apply an operations setback zone of 200 feet to all agricultural operations.
7. Handle dredge material in a way that minimizes resuspension or leaching into the water column, especially when those sediments are known to be polluted with heavy metals, polynucleated aromatic hydrocarbons (PAH) or tributyltin (TBT).

UPLAND EROSION

1. Implement and enforce the design considerations in the City of Portsmouth Erosion and Sediment Control Handbook and upgrade these methods, especially those concerning post-construction control.
2. Eliminate exemptions for creating erosion and sediment plans for railways, utilities, federal installations and surface mining. Create conditional exemptions for farming and forestry practices with strong restrictions in coastal areas.
3. Create tax exemption incentives for leaving highly erodible soils undisturbed on construction sites and uncultivated on farmlands. Create exemptions for preserving or creating vegetative buffers adjacent creeks and coastline.

Specific criteria recommended by the MRC to achieve these objectives include: siting marinas near the mouth of slow-moving tidal creeks rather than near the headwaters, prohibiting the structure from encroaching more than one-third the distance across the waterway, locating slips for deep draft vessels in the naturally deeper waters of the marina, and designing any necessary breakwaters to minimize water circulation impedance by using non-permanent designs. (Disturbance of topsoil, through cultivation or construction, increases the permeability of the soil and thus increases its erosion potential. The bluffs along the Cox property are a dramatic example of this phenomenon. Buffer areas along bank edges eliminate this problem).

4. Coordinate clearing and construction schedules to minimize the time land is left unvegetated. Install storm sewer networks as quickly as possible in the construction process. This strategy is most beneficial at residential development sites.

5. Design storm sewer networks to distribute and disperse stormwater rather than concentrating it at single large outflows. This decreases erosion stress on carrying channels and vegetative filtering areas.
6. Consult the Norfolk County Soil Survey to determine the engineering properties of the soils present when considering appropriate construction techniques on newly developed coastal sites. Design construction to accommodate any constraints.
7. Remove and store topsoil carefully to minimize loss through mixing with subsoil and through stockpile erosion. Appropriate placement of properly stored topsoil greatly enhances revegetation efforts.
8. Reclaim abandoned sand and gravel pits by grading and revegetation to eliminate erosion and off-site sediment transfer by wind or water.

SHORELINE STABILIZATION

1. Locate vertical bulkheads (for erosion control or site grading) upland of wetland boundaries and normal wave action. Such construction preserves the natural erosion buffer of any wetlands and is easier, cheaper and less susceptible to undercutting by wave action.
2. Use shore stabilization structures that reach the waters edge only when essential to erosion control or permitted deep port land uses. Design the structures carefully to fit specific requirements.
3. Avoid vertical shoreline stabilization structures that reach the waters edge. Such designs are less resistant to wave-induced erosion of supporting sediments and may transfer damaging wave energy to adjacent property. Use seawalls of interlocking blocks with parabolic curves and a rock crib at the toe in high wave-energy areas. These structures they are highly resistant to collapse from erosion, and they dissipate wave energy almost completely.
4. Use terraced or sloped riprap revetments and gabions instead of smooth, rigidly designed seawalls, even curved ones. Terraced and sloped gabions have cheaper construction, superior wave energy dissipation and sediment accretion rather than erosion. Gabions also permit natural development of vegetation and provide a suitable habitat for animals important in estuarine food chains. These physical properties reduce maintenance and provide greater stability over time, as well as providing ecological advantages.

5. Stabilize eroded shoreline bluffs along the Cox Property and Rivershore by designing combinations of regrading to gradual slopes and revegetation (especially with wide bands of saltmarsh cordgrass on long low toes of slopes). Place sand trapping sills at or near the mean low water line on adjacent tidal flats.
6. Avoid jetties unless unusual conditions require them for deep channel maintenance. In those cases, place the jetties in a way that avoids alterations in current pattern that would erode adjacent property.

WETLAND PROTECTION AND RESTORATION

The first five strategies refer to general protection and maintenance (establishment of a wetlands board is dealt with in the zoning and related development control section).

1. Initiate a comprehensive public education program to heighten awareness of the many benefits Portsmouth gains, both directly and indirectly, from its wetland resources.
2. Permit and encourage development plans that will not modify the wetlands directly (through filling or dredging) or indirectly (through changes in water flow or increased sediment or pollution). The high degree of shoreline development in Portsmouth increases the value of the functions provided by the remaining wetlands.
3. Maintain fully functioning wetland ecosystems by designing vegetated buffer areas between the upland edge of the wetland and the closest limit of land disturbance. Depending on site conditions, these buffers should be 50 to 200 feet wide. Adjacent upland vegetation improves wetland drainage, erosion and flood control as well as increasing habitat value and species diversity. If buffers are not provided as an integral part of the wetland, upland erosion, runoff and pollution impacts may destroy the marsh vegetation as well.
4. Avoid placing fill over marsh or coastal beach soils. This practice usually causes subsidence and damage to roads or buildings constructed over such fill and may cause additional destruction of wetlands and erosion when adjoining marshlands heave up in response to the weight of the fill. Significant filling of wetland areas generally causes an irretrievable loss of the wetlands and their associated values. To avoid such effects, build on adjacent upland soils; bridge over fragile soils; or build on driven pile supports.

When coastal zone filling is unavoidable, restrict wetland destruction to less valuable types such as reed grass and saltbush communities. Contain fills along beach areas at or above the mean high water line. Destruction of non-vegetated wetlands (e.g. tidal flats) has many of the same negative consequences as destruction of saltmarsh.

5. Avoid covering wetlands with dredge material when other disposal alternatives exist. In some circumstances, small amounts of material may be deposited in ways that minimize wetland loss and preserve site hydrology and elevation. This can be accomplished by using a broadcast spreader to scatter spoil in a thin, even layer or by depositing small, separate mounds in locations that create the least impact. If dikes are created, they should be breached at intervals and eventually removed to recreate initial grade and drainage.

The following six strategies outline appropriate measures for restoring or creating new marsh areas.

1. Create or restore wetlands in low energy areas such as the headwaters of tidal creeks, shallow water areas, within the convex banks of river and creek bends, within areas of active sediment accumulation and away from areas with long fetch exposure in the direction of prevailing winds. Two potential wetland locations are Scotts Creek and Lily Creek. The Rivershore area and the Cox Property also need stabilization, but present greater challenges due to storm tide and wind stresses.
2. Configure created wetlands to complement the surrounding landform and respect natural current flow.
3. Phase restoration operations to allow continued stability of the site during formation of the wetlands.
4. Obtain suitable material for marsh shaping from clean dredge spoil. Material high in sand content is preferable. Use the coarsest materials to protect exposed areas against wave erosion by forming wide rims on the windward face of the marsh above the elevation of average wave run-up. Use marsh peat displaced from permitted construction in new marsh construction.
5. Plan the final grade of the marsh and rims to minimize erosion of sediments off-site. Increase the area available for planting by making the slope as long and gentle as possible and keeping it within the elevations that support existing marsh vegetation nearby.

6. Renew and restore coastal areas with three types of revegetation associated with marsh vegetation: upland vegetation, emergent marshes at mid-range elevations and submerged aquatic vegetation. The interactions of tide range, elevation, slope and salinity determine the boundary between upland-high marsh plantings and low marsh plantings. Maximize the extent of saltmarsh cordgrass (low marsh) without encroaching significantly on existing tidal flats. Use cordgrass sprigs from cultivated sources and supplement them by selective thinning adjacent marsh. When water quality allows, consider planting eelgrass to establish submarine meadows in locations beneficial to marine life.

WILDLIFE

1. Maintain enough quality, extent and diversity of aquatic and terrestrial habitat to support stable resident populations and provide for the needs of migrating fish and wildlife populations.
2. Apply mosquito control ditches in wetlands judiciously. Design the ditches to drain specific problem areas; create the ditches with rotary ditchers to minimize impact to adjacent marsh; and avoid excessive drainage to control mosquito hatching.
3. Balance channel dredge depths between minimizing maintenance dredging and controlling the development of oxygen-depleted water pockets detrimental to shellfish.
4. Weigh the need for new dredged channels against the potential for habitat degradation and associated loss of marine productivity. Moderate impacts by avoiding existing beds of aquatic vegetation, oyster rocks and other shellfish beds.
5. Avoid or limit dredging activities within 500 yards of oyster grounds during July, August and September to allow establishment of larval oysters on clean bottoms. Avoid dredging during December, January and February because all oysters, including adults, are susceptible to dredging effects because their ability to clear choking silt away is lessened in cold weather.
6. Minimize dredging from March through October where spawning or nursery grounds of anadromous fish may be affected, especially during the active nesting and spawning period, mid-March through June. November is the optimum month for dredging to avoid both of these impacts to shellfish and fin fish.

The following three strategies will aid in the management of particular rare and sensitive species known in Portsmouth.

1. Limit loss, hydrological alteration or other degradation of all tidal or non-tidal wetlands and their buffer areas.
2. Control the selection and application of pesticides and fertilizers to minimize their migration off-site from lawns, gardens, orchards, croplands.
3. Provide preferred habitat for southern bog lemmings by developing and maintaining freshwater marshes, unwooded areas and edges between wetland and upland vegetation. The other two strategies also benefit this species.

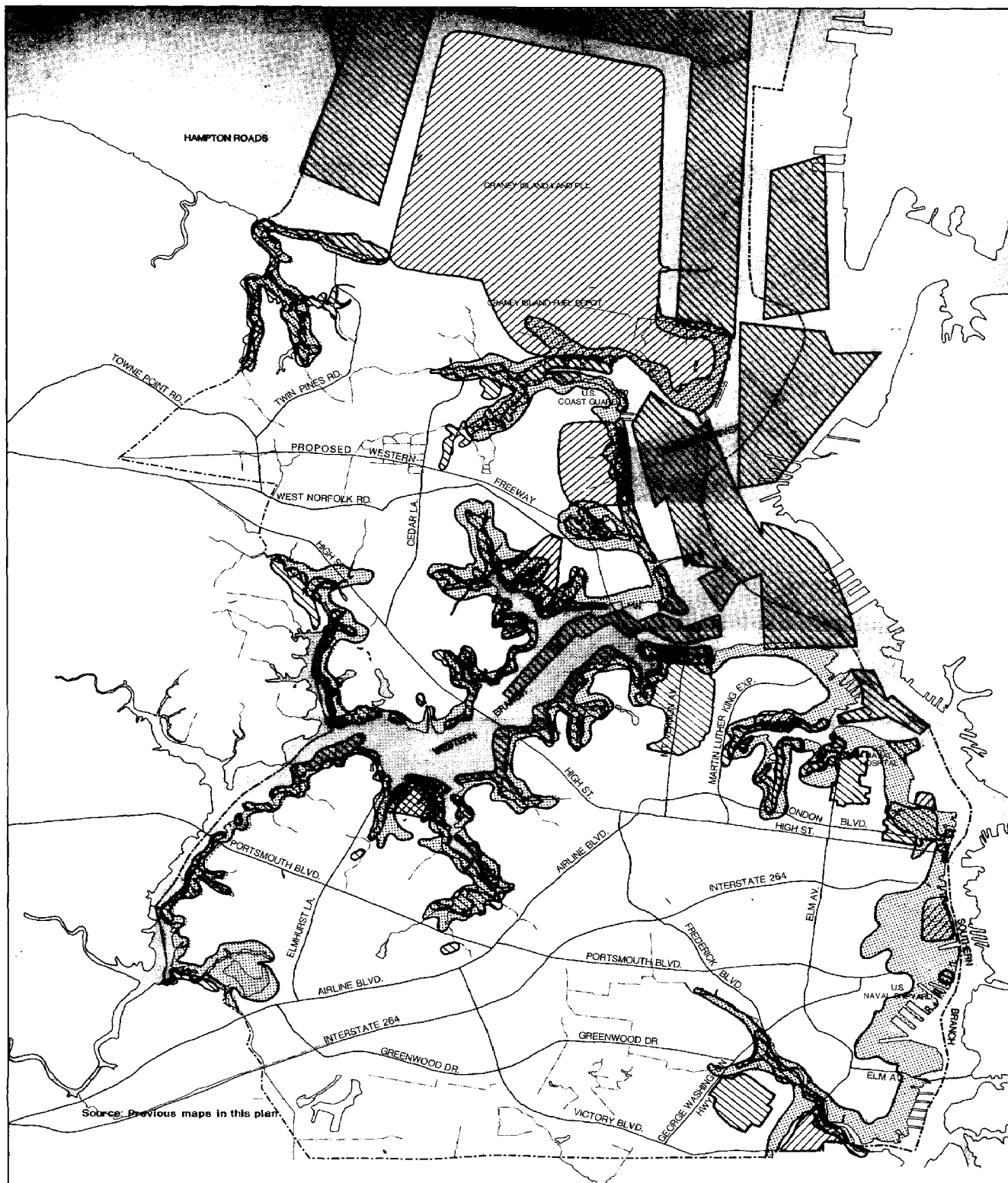
HISTORICAL CULTURAL RESOURCES

For a program to succeed, participation from the general public is necessary. The final three strategies provide a foundation for any historic preservation program.

1. Organize a grass-roots citizens' committee dedicated to historic preservation.
2. Communicate preservation goals and programs to the public. Communication at an early stage can lead to an effective program later by promoting benefits to be gained by the community and dispelling immediate fears.
3. Survey and document all existing historic and cultural resources so that a record exists in the event any resources are demolished or lost.
4. Enact ordinances that address protection of cultural resources. Community preservation ordinances generally protect specific areas such as landmarks. Commission ordinances cover a larger political subdivision like a city or a county. Virginia's enabling legislation its level of authority would need to be reviewed for the process.
5. Develop an easement program for historic facades, open spaces or scenic vistas. Easements can restrict development or alterations to an existing facade or can restrict development and maintain qualities of land, such as an undisturbed Indian burial ground. Ideally, an open space easement conserves undeveloped land areas.
6. Execute covenants between private parties to protect the historic integrity of a specific resource. Normally a covenant "runs with the land." Often a reverter clause is included in the agreement that stipulates certain conditions must be met in order for the agreement to continue.

The following three strategies recognize historic conservation's potential for revitalization.

1. Promote tax incentives as an advantage of historic rehabilitation. Although the Tax Recovery Action cut some of the incentives, a 20% Investment Tax Credit is still available for certifiably historic projects, rehabilitated in accordance with the Secretary of the Interior's Standards for Rehabilitation.
2. Provide tax abatements to assist some projects that are willing to participate in a historic preservation program.
3. Develop a comprehensive plan for the renovation, rehabilitation and reconstruction of waterfront properties.



Portsmouth Virginia

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DEPARTMENT OF PLANNING
CITY OF PORTSMOUTH, VIRGINIA

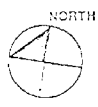
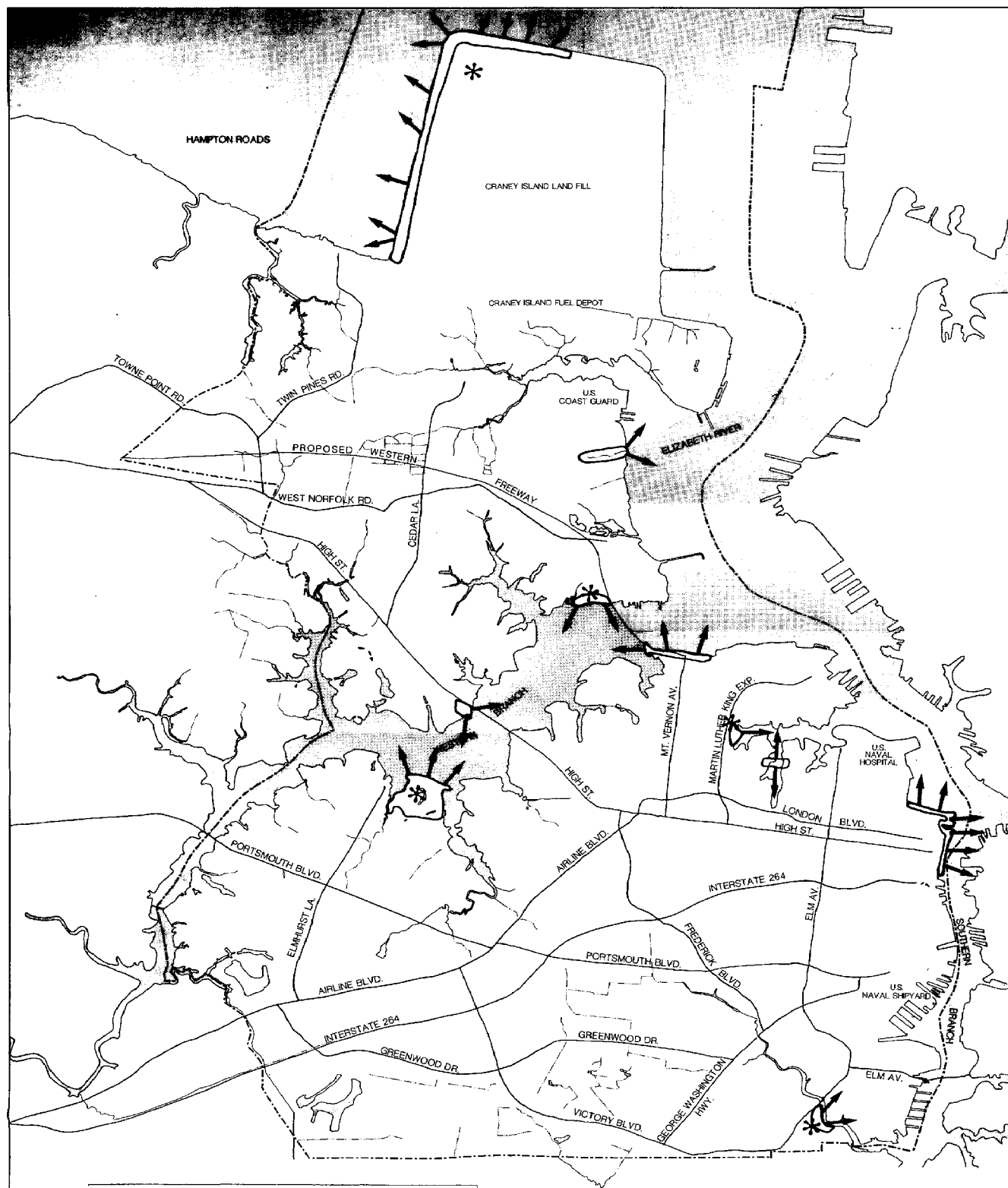


Figure 3-1
**SIGNIFICANT COASTAL
LAND USE AREAS**

LEGEND

-  Prime Economic Development Areas
-  Flood/Erosion Hazard Areas
-  Productive Natural Resource Areas



Portsmouth Virginia

0 1000 2000 4000 8000 FEET

DEPARTMENT OF PLANNING
CITY OF PORTSMOUTH, VIRGINIA



Figure 3-3 PUBLIC ACCESS STRATEGY

LEGEND

- Public Access Points
- Public Boat Ramp Locations
- Public Views/Vistas

Figure 3-4
 IDEALIZED INFILTRATION TRENCH CROSS-SECTION
 DETAILING INLET CONSTRUCTION
 (NOT TO SCALE)

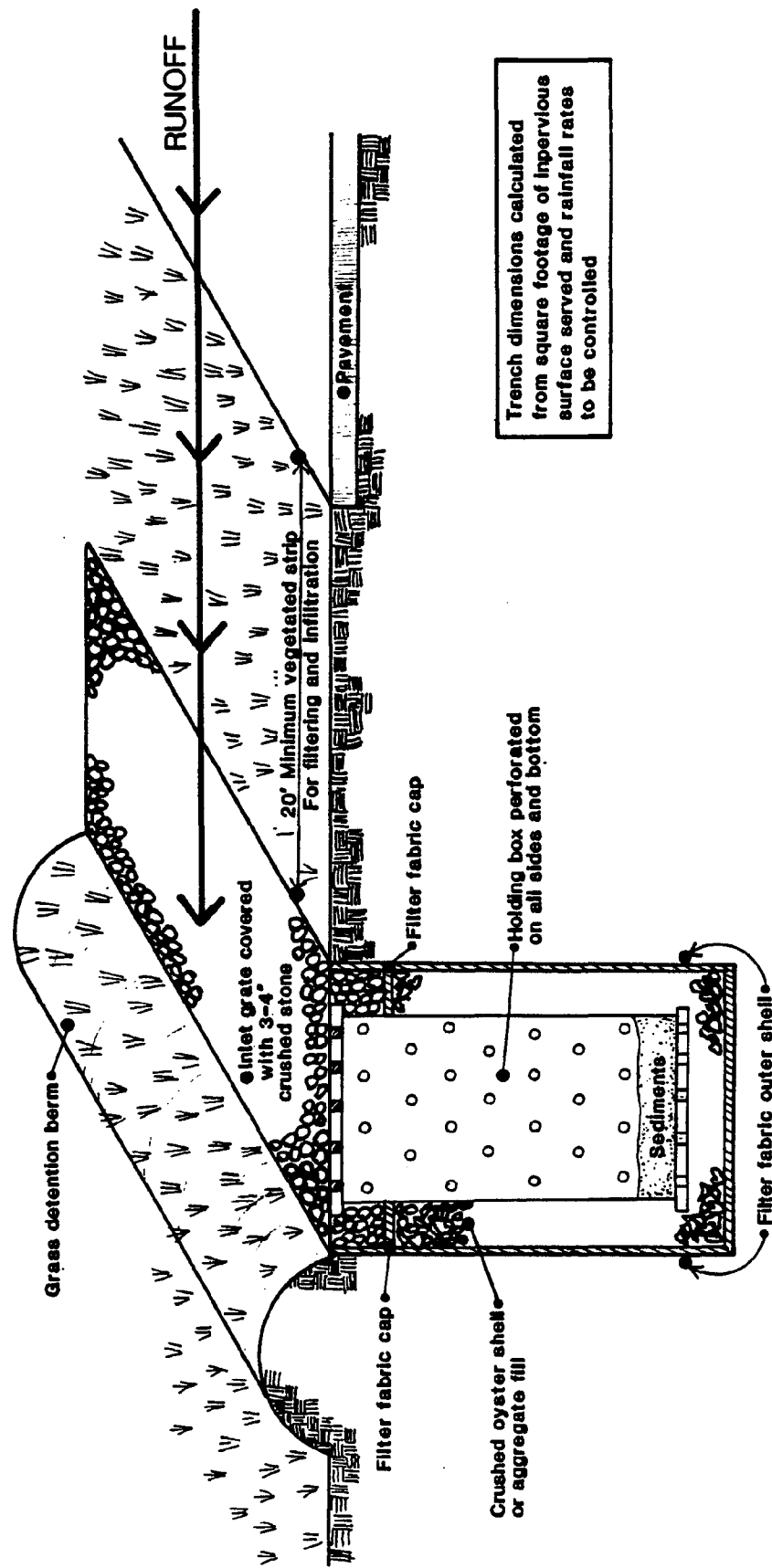
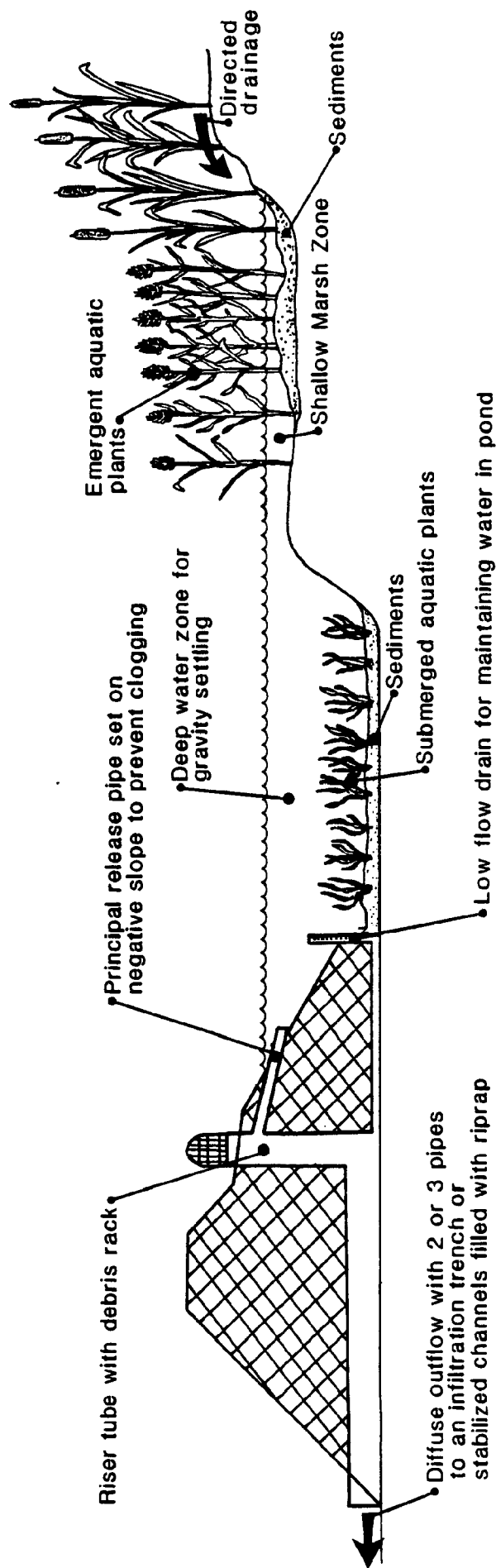


Figure 3-5
WET RETENTION POND CROSS-SECTION SHOWING
SHALLOW MARSH FILTER
(NOT TO SCALE)





APPENDIX A

ABBREVIATION AND ACRONYM DEFINITIONS

BMP	-	Best Management Practices
BOD	-	Biochemical Oxygen Demand
CBIP	-	Chesapeake Bay Initiatives Program
CGIF	-	Commission of Game and Inland Fisheries
COE	-	Council on the Environment
CP	-	Commerce Park
CZLU	-	Coastal Zone Land Use
CZM	-	Coastal Zone Management
CZMA	-	Coastal Zone Management Act
DCHR	-	Department of Conservation and Historic Resources
DO	-	Dissolved Oxygen
DOD	-	Department of Defense
DOH	-	Department of Health
DPR	-	Division of Parks and Recreation
EIS	-	Environmental Impact Statement
EPA	-	Environmental Protection Agency
FAFWRP	-	Federal Aid for Fish and Wildlife Restoration Program
FEMA	-	Federal Emergency Management Agency
FIA	-	Flood Insurance Administration
FWPCA	-	Federal Water Pollution Control Act of 1977
FWPRA	-	Federal Water Project Recreation Action
GAO	-	Government Accounting Office
GAPC	-	Geographic Area of Particular Concern
HRWQA	-	Hampton Roads Water Quality Agency
HRWQMP	-	Hampton Roads Water Quality Management Plan
LWCF	-	Land and Water Conservation Funds
MLW	-	Mean Low Water Elevation
MRC	-	Marine Resources Commission
MSL	-	Mean Sea Level
MWL	-	Mean Water Level
NESP	-	National Estuarine Sanctuary Program
NEPA	-	National Environmental Policy Act
NFIP	-	National Flood Insurance Program
NOAA	-	National Oceanic and Atmospheric Administration
NPDES	-	National Pollution Discharge Elimination System
NWF	-	National Wildlife Federation
OCRM	-	Office of Ocean and Coastal Resources Management
ODU	-	Old Dominion University
PAH	-	Polynucleated Aromatic Hydrocarbons
POP	-	Planned Office Park
ppb	-	parts per billion
SAPCB	-	State Air Pollution Control Board
SCORP	-	State Comprehensive Outdoor Recreation Plan

APPENDIX A (CONTINUED)

SCS	-	Soil Conservation Service
SEAS	-	Shoreline Erosion Advisory Services
STP	-	Sewage Treatment Plant
SVPDC	-	Southeastern Virginia Planning District Commission
SWCB	-	State Water Control Board
SWCC	-	Soil and Water Conservation Commission
TBT	-	Tributyltin
TNC	-	The Nature Conservancy
TPL	-	The Trust for Public Lands
USCOE	-	United States Army Corps of Engineers
USEPA	-	United States Environmental Protection Agency
USGS	-	United States Geological Survey
VADA	-	Virginia Area Development Act
VCRMP	-	Virginia Coastal Resources Management Program
VIMS	-	Virginia Institute of Marine Science
VMRC	-	Virginia Marine Resources Commission
VOF	-	Virginia Outdoors Fund
VOP	-	Virginia Outdoors Plan
VRA	-	Virginia Resources Authority

APPENDIX B
TECHNICAL GLOSSARY

Accretion - An accumulation of wave-deposited sediment that eventually allows invasion by vegetation.

Algal Blooms - A proliferation of living algae on the surface of lakes, streams or ponds.

Bactericide - An agent that destroys bacteria.

Barrier Island - Elongate seafront islands formed by wave deposits, lying offshore and generally with their longest axis parallel to the shore.

Bioassay - The employment of living organisms to determine the biological effect of some substance, factor or condition.

Biochemical Oxygen Demand (BOD) - A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water.

Biocide - A poisonous chemical that can kill living organisms; used for eradication of pests (e.g., barnacles).

Buffer - A designated land or water area, along the perimeter of some land use, whose own use is regulated so as to resist, absorb or otherwise preclude unwanted development or other intrusions into areas beyond the buffer.

Carbonaceous Fuels - Carbon-based fuels such as coal, oil and gasoline.

Coastal Terrace - Gently sloping landforms gradually descending to the sea; may be natural or man-made.

Conventional Pollutants - Primarily inorganic pollutants most usually associated to point source discharges (e.g., heavy metals, synthetic organic compounds).

Creosote - Wood-tar or coal-tar distillate used as a wood preservative.

Culvert - A drain or conduit under a road or embankment.

Degradation - To be degraded, lowered, demoted, decreased in value or usefulness.

Dendritic Channels - Small tributaries with many tooth-like extensions.

Dredge Slurry Inflow - Pipe depositing hydraulic dredge material into a retention basin.

APPENDIX B (CONTINUED)

Easement - An interest in the land of another that allows the easements holder specified uses or rights without actual ownership of the land; may be conservation, recreation, historical or scenic easements.

Ecosystem - The interacting system of a biological community and its non-living environment.

Embayment Marsh - Those marsh areas enclosed by the concave surface of a land form, generally within the upper reaches or tributaries of tidal creeks.

Environmental Impact Assessment - A document prepared by a federal agency when an action supported by federal funds is analyzed for its significant social, economic or environmental impacts.

Estuary - Area where the fresh water meets salt water; serves as nursery or spawning and feed grounds.

Fecal Coliform Bacteria (Coliforms) - A group of organisms common to the intestinal tracts of man and of animals.

Fringe Marsh - A narrow band of marsh vegetation existing along the banks of a creek or river; often a remnant of a once more extensive marsh that has been dredged or otherwise disturbed.

Gabions - Metal-screened structure (aluminum or plastic-coated galvanized steel) filled with resilient materials (rip rap, concrete, vegetation plantings) that generally serves to cushion banks or beaches from the erosive force of moving water.

Habitat - An area possessing characteristics in which a plant or animal naturally thrives and is ordinarily found; native environment.

Hydrology - The science encompassing the behavior of water as it occurs in the atmosphere, on the surface of the ground, and underground.

Impervious - Not allowing water to pass through.

Indigenous (species) - Any species of wildlife native to a given land or water area by natural occurrence.

Intertidal Beach - An unvegetated land area along the shoreline lying at an elevation between mean high water and mean low water.

Jetty - A wall built out into the water to restrain currents, protect a harbor, etc.

APPENDIX B (CONTINUED)

Larva - The early form of any animal that changes structurally when it becomes an adult; particularly sensitive to pollution.

Loamy - A soil containing sufficient organic matter and less than 50 percent clay so that it exhibits some sponginess.

Mean High Water Mark - The average height of high waters over a 19-year period.

Mean Seal Level (MSL) - The average tidal level halfway between high and low tide; used as a standard in measuring land elevation or ocean depth.

Migrants - Wildlife that use the area resources along migration route; may be present during varying periods in spring and fall.

"Navigable Water" - Water bodies that have been or may be suitable for use to transport interstate or foreign commerce.

Non-point Source of Pollution - Pollution derived from overland runoff rather than specific point source outflows from industrial process pipes.

Nutrients - Elements or compounds essential as raw materials for organism growth and development; for example, carbon, oxygen, nitrogen and phosphorus.

Permeable - That which can be permeated or penetrated, as by fluids.

pH - A measure of the acidity or alkalinity of a material, liquid or solid.

Point Source of Pollution - Pollution generally derived from outfall pipes directly related to wastewater treatment or industrial processes.

Polynuclear Aromatic Hydrocarbons (PAHs) - Benzene-based compounds, primarily formed as a result of the combustion of carbonaceous fuels, which produce toxic properties on marine life.

Porous - Full of pores, through which fluids, air or light may pass.

Rechannelization - Restructuring of a linear body of water, generally a river or creek, to heighten the passage of water; often damaging to habitat values of the water body.

Revetment - A facing of stone, cement, sandbags, or other stable material to protect a wall or bank of earth from erosion.

APPENDIX B (CONTINUED)

Rip Rap - Rock, stone or other rough material placed on stream banks and other structures to prevent water erosion or to accumulate sand.

Seawall - A rigid structure constructed at the water's edge; appropriate for intense waterfront development such as deep water ports.

Soil Series - A group of soils with similar characteristics which are derived from the same parent material.

Subaqueous - Those lands lying at elevations below mean low water.

Swale (grassed) - A gently curving linear depression designed to conduct water into the ground or off-site.

Thimble Shoals - An area in the southern part of the Chesapeake Bay, south of the eastern shore, which is very productive in shellfish production; 90 percent of adult female blue crabs in the Chesapeake Bay spend the winter here.

Turbidity - Water cloudiness caused primarily by suspended sediment.

Toxic - Of, affected by, or caused by a toxin; poisonous.

Water-Dependent Projects - Those facilities proposed for construction that depend on access to existing natural water features for their function (e.g., marinas, ports).

Wetlands - Land areas exhibiting soil and water characteristics that predominantly support plants and animals that thrive in high moisture conditions.

APPENDIX C

COASTAL ZONE MANAGEMENT FUNDING SOURCES

This appendix suggests a number of sources for financial assistance available to aid Portsmouth in carrying out various Coastal Zone Management objectives. These sources range from federal to state to private origins. They take the form of grants, matching grants, low interest loans, and non-financial support strategies. Sources are often focused on particular issue areas. Many projects, however, are supported by a consortium of federal, state and local agencies, private organizations, and industries. Sometimes donations of property are made in lieu of funds. The majority of program funds available are administered at the state level. Federal assistance opportunities are highlighted in more detail because they may be less commonly known.

FEDERAL

The Chesapeake Bay Agreement of 1987

This regional initiative under the Environmental Protection Agency and the Chesapeake Bay Commission has received proposed requests totalling \$54.9 million to implement initiatives related to improvement of water quality, development of outdoor recreation facilities, and protection of fish and game resources within the Chesapeake Bay watershed. The newly established Chesapeake Bay local assistance department has more information regarding this agreement.

Federal Coastal Zone Management Act of 1972

Virginia's specific state-administered programs are discussed in the State Section of this appendix under the heading Virginia Coastal Resource Management Program.

1965 Federal Water Project Recreation Act (FWPRA)

FWPRA mandates outdoor recreation, fish and wildlife enhancement consideration in planning and developing all federal navigation, flood control, reclamation and multipurpose reservoir projects. It requires state and local coordination in project planning and management, and encourages non-federal management of project lands and waters for recreation and for fish and wildlife purposes. The Act provides up to 50

APPENDIX C (CONTINUED)

percent of development costs for state and local recreation facilities (75 percent for fish and wildlife enhancement) on project lands, when non-federal sponsors agree to operate and maintain these facilities. Loans to state and local governments to help match the federal share of development costs are empowered by the Act.

National Estuarine Sanctuary Program (NESP)

The NESP was established through Section 315, of the 1972 Coastal Zone Management Act, as amended in 1976. This program makes available matching grants (50 percent) to coastal states for acquiring, developing, or operating estuarine areas set aside "to serve as natural field laboratories in which to study and gather data on the natural and human processes occurring within the estuaries of the coastal zone." The purpose of the program is to establish estuarine reserve systems representative of different coastal bio-geographical regions which can be used for scientific study and education. The Commonwealth of Virginia and the State of Maryland are working together to develop a Chesapeake Bay Estuarine Research Reserve System as part of a national system established by Section 315 of the Coastal Zone Management Act. Funding for the reserve system comes from the National Oceanic and Atmospheric Administration under which the National Estuarine Research Reserve Program operates.

The Federal Water Pollution Control Act of 1977 (FWPCA)

There are several EPA and joint EPA - Heritage Conservation and Recreation Services programs that have been precipitated primarily by the FWPCA. These funding possibilities are associated with specific objectives in improving land use and recreational development as they relate to water quality maintenance or improvement. Further information may be obtained from either of these agencies.

Land and Water Conservation Fund (LWCF)

This fund is administered by the Heritage Conservation and Recreation Service and is a major categorical grant program for recreation. It provides matching grants to state and local governments for acquisition and development of public parks and recreation areas. These funds can be made available for urban waterfronts, access, and acquisition of stream banks, development of recreational water areas, etc.

APPENDIX C (CONTINUED)

National Flood Insurance Program (NFIP)

The NFIP offers federally subsidized flood insurance (up to 90 percent in participating communities imposing required land use controls on new development). The program discourages new developments in river floodways, but allows floodproof construction on the floodplain fringe. Further information regarding current requirements of eligibility may be obtained from the regional office of the Federal Emergency Management Agency.

Federal Aid for Fish and Wildlife Restoration Program (FAFWRP)

This program was instituted by the Federal Aid for Fish and Wildlife Restoration Act, also known as the Pittman-Robertson Act. This program offers fund-matching grants for planners and developers interested in managing land and water areas for wildlife. Further information may be obtained from the regional office of the U.S. Fish and Wildlife Service or the Commission of Game and Inland Fisheries.

STATE

Virginia Coastal Resource Management Program (VCRMP)

This program was initiated by the Federal Coastal Zone Management Act of 1972 and is overseen by the Office of Ocean and Coastal Resource Management of the National Oceanic and Atmosphere Administration. The program is administered by the Council on the Environment and makes the Commonwealth eligible for federal CZMA funds. The program offers grants for waterfront development. State coastal zone grants can be used for comprehensive waterfront planning to support planning, design and engineering studies for urban waterfront revitalization, including protection and restoration of historic, cultural, and aesthetic resources. Industrial and port development and increased coastal access for public recreation purposes are included. Section 306A of the National Legislation contains provisions authorizing grants for redevelopment of deteriorating and underutilized urban waterfronts and ports, provision of access to public coastal areas, and the preservation and restoration of certain other valuable coastal areas. Page V-23 of Virginia's Coastal Resource Management Program and Final Environmental Impact Statement states,

"Any local government or regional authority wishing to apply for waterfront development funds through the VCRMP must request that the area be designated a Waterfront Development GAPC. The public benefits to be

APPENDIX C (CONTINUED)

derived from the designation of the area must be identified and substantiated. Public benefits would include such things as increased recreational access, creation of new local employment, provision for docking and marketing facilities for local watermen, etc."

A designation request must accompany any application for funds to a waterfront development GAPC. In order to achieve designation as a waterfront development GAPC, an area must have a comprehensive development and management plan that meets all local, state and federal environmental requirements. Adequate access to the site must be available. Finally, full public participation in the planning and development of the area must be encouraged and facilitated.

Commission on Game and Inland Fisheries (CGIF)

The Governor's budget for 1988-1990 allocates \$400,000 to be distributed by the CGIF to localities for developing improved public access (boat ramps, etc.) for fishing and recreational boating opportunities. More information regarding potential opportunities within Portsmouth may be obtained from the Chesapeake regional office.

Department of Conservation and Historical Resources (DCHR)

In the 1988-1990 budget, \$5.7 million (general fund) and \$2.9 million (nongeneral funds) are allocated to the DCHR to expand the Best Management Practices Program (BMPP) on agricultural land and to improve erosion and sediment control on construction sites. A total of \$15.7 million is now available for administration of these programs. Further information may be obtained from the Division of Soil and Water Conservation within the DCHR.

Virginia Outdoors Fund (VOF)

The VOF is an important supporting funding source for acquisition of waterfront recreational land. The Division of Parks and Recreation within the DCHR administers the fund in accordance with the Virginia Outdoors Plan. Federal funds allocated from the Land and Water Conservation Fund are used to match various state and local funds. The majority of eligible projects are state parkland acquisition, fisheries projects and Regional Parks Authority projects. Funds totalling \$5.7 million dollars are available to DCHR to participate in this joint funding program. More information may be obtained from the DCHR or the Commission on Game and Inland Fisheries.

APPENDIX C (CONTINUED)

Virginia Resources Authority (VRA)

The VRA was created through the Chesapeake Bay Initiative Program (CBIP) to relieve some of the future capital needs for water and wastewater treatment by providing low interest financing strategies for community facilities. There is a three-tier approach to funding. AAA-rated bank bonds are sold through a program administered by the VRA. A pooled loan is available on the open market. (These are AA-rated variable interest loans to reduce interest rates.) This loan pool is also administered by the VRA and currently has a biennial budget of \$100 million for construction of new water treatment facilities. Finally, the state water control board administers a revolving loan fund for design and engineering costs. The entire program is overseen by the Council on the Environment.

Shoreline Erosion Advisory Service (SEAS)

Provided through the Division of Soil and Water Conservation of the Department of Conservation and Historic Resources, this service assists private landowners and municipalities in controlling shoreline erosion problems. Otherwise expensive professional site inspections, written engineering analyses and recommendations are provided free of charge through SEAS. Inspectors can often recommend much less expensive (and more environmentally sound) vegetative stabilization designs. SEAS cannot, however, develop detailed design plans or provide construction money for recommended measures.

NON-PROFIT ORGANIZATIONS AND TAX RELIEF STRATEGIES

This section deals primarily with ways to set aside public land (parks, natural areas, cultural sites) with financial packages that include land transfer methods that do not require capital outlay or that can be used in conjunction with outright acquisition.

The Trust for Public Lands (TPL)

One of the most effective non-governmental methods for setting aside public land is the establishment of land trusts managed by non-profit citizen organizations. The TPL assists concerned community groups in forming a land trust and pre-acquiring real estate. Land donations, low cost sale and protective land use agreements made in negotiation with a non-profit

APPENDIX C (CONTINUED)

land trust are tax-deductible and offer substantial tax benefits to individuals and corporations. The TPL provides a computerized tax benefit analysis that helps structure customized transactions which benefit all parties. The TPL has helped create over 100 local land trusts protecting more than 20,000 acres. Further information can be obtained from the Southeast Regional office in Tallahassee, (904) 222-9280.

The Nature Conservancy (TNC)

Headquartered in Arlington, Virginia, TNC raises funds to protect ecologically important areas like remnant wetlands or habitats for endangered species. Two notable examples in Virginia are the Great Dismal Swamp and the Virginia Coast Reserve, but TNC often deals with smaller parcels. TNC receives tax benefits from land transfers that are similar to those enjoyed by the TPL.

Land sold at less than full market value allows previous owners to deduct the difference between full market value and actual selling price from federal income tax. The seller also enjoys a reduction in federal capital gains tax. TNC also handles donations from public organizations, commercial corporations and private individuals to assemble consolidated land areas and acquisition plans.

The Audubon Society

Although most of the land acquired by the Audubon Society has been donated, some has been purchased either independently or jointly with other conservation groups.

The Audubon Society does not always purchase the full fee (all the rights) in land and may acquire only a partial interest to prevent development. In addition, where full ownership is transferred to the Society, land may be leased to other groups for management and use.

In addition to protecting donated and purchased lands, the Audubon Society sometimes provides wardens and other management for State and locally-owned land when management funds are not otherwise available.

APPENDIX C (CONTINUED)

OTHER PRIVATE SOURCES

The Sierra Club has a strong interest protecting wetlands and aiding acquisition groups (listed above) in their efforts. The National Wildlife Federation (NWF) uses its Land Heritage Program as a conduit for channeling gifts of land to managing community groups. In this way, the NWF acts as a clearinghouse for conservation land transfers. Local citizen conservation groups are often founded to perform the organizational, fund-raising and long-term management duties of land acquisition projects.

Actual sources of funds (exclusive of conservation action groups) may come from the Izaak Walton League of America Endowment, private industries, philanthropic corporations or foundations such as Ford and Rockefeller.

Land Protection through Management Agreements

Through deed restrictions, covenants and easements, private landowners may protect their lands even after their death or sale of the property. Tax advantages are associated with each of these agreements too. Conservation groups and land trusts can provide model language to incorporate conservation agreements, become a party to preservation agreements and act as recipients of easements.

Deed restrictions are clauses restricting the future use of land. They often include a reverter clause that states that if land is not managed properly (e.g. wetlands are destroyed), it returns to its original owner, heir or a third party, such as a conservation group.

Covenants are contracts between a landowner and another party stating that the landowner will use or refrain from using his land in an agreed-upon manner. These are appropriate when deed restrictions are not legally enforceable. Private landowners may even be paid by conservation groups to attach covenants to their deeds, in lieu of purchasing the land.

Conservation easements are used to transfer certain management privileges to land to specified conservation groups without transferring title to the land. These may be positive easements (e.g., allowing public access to the waterfront) or negative easements (e.g., requiring landowners to refrain from construction near the coastal zone). Appurtenant easements (those benefitting adjacent lands, e.g., restricting cultivation of land adjacent a neighbor's wetland) are more legally binding than other types.

APPENDIX C (CONTINUED)

Tax Incentives

The major tax incentives that encourage wetland preservation or offset negative tax implications of regulations are discussed in general in this section. A tax lawyer should be consulted to work out an optimum plan for eligible tax relief in site-specific scenarios. Four tax types are discussed in this section: Real estate, income, gift and estate taxes.

Real estate taxes are assessed based on existing market value of the property and usually include a factor for development potential. Preferential real estate tax assessment clauses are utilized in Virginia for open space/conservation lands. Among other things, this tax law relieves elevated tax assessments associated with increasing development pressure. The statute is not expressly designed for wetland protection but does not conflict with that objective. The most effective implementation of preferential assessment requires payment of deferred taxes if the lands are ever converted to a use incompatible with open space or conservation. This protects against use of the provision as a tax dodge while waiting for the sale value of the property to escalate. Massachusetts and, to a lesser extent, New York, have real estate tax incentive laws aimed specifically at strengthening the inducement to preserve wetlands in particular.

Income tax advantages are available to any landowner (individual or corporate) who donates land to a non-profit entity or enters into any of the land protection management agreements with a non-profit entity listed in the previous section. Again, such an entity could be a land trust, conservation group or government body. Federal Internal Revenue Code allows landowners to deduct the full value of capital gain tax on donated properties. Depending on the ratio of that deduction to annual adjusted gross income, the landowner may carry over deductions for up to a six-year period (often the case for individual landowners holding substantial acreage). The deduction is limited to donations or management agreements that are "exclusively for conservation purposes" and "granted in perpetuity." In other words, the land must be forever set aside for conservation purposes including: preservation, recreation, education, scenic enjoyment or historical areas.

Gift taxes are assessed upon transfer of an interest in property not involving an actual sale (as in a donation). However, the Federal Internal Revenue Code also allows that such donations to government units or non-profit organizations are not subject to gift taxes. The same restrictions of perpetual conservation use also applies to this allowance.

APPENDIX C (CONTINUED)

Estate taxes are similar to gift taxes in that a non-sale transfer of land is involved. Upon an owner's death these taxes become payable by the heir. This tax can be especially harsh on an individual landowner holding substantial undeveloped acreage. Pressure to pay could result in sale or subdivision of the land just to pay the tax. In order to prevent involuntary development of the land, a property owner can bequest the land or a portion of it to a non-profit conservation group or enter into an easement agreement that allows his heirs to live on or otherwise use the property while releasing its management to the conservation group. Such arrangements can lessen the estate tax to a tolerable amount so the heir can continue to own the property.

APPENDIX D

INDUSTRIAL PERFORMANCE STANDARDS

Performance standards for the W-2 District could include the following:

- ° Establishments should be required to document and have on file with the City all industrial materials used and stored on the site, as per United States Environmental Protection Agency (USEPA) and State Water Control Board regulations.
- ° Outdoor storage of materials is permitted at a setback of 50 feet upland of the mean high water mark provided such materials are stored in completely enclosed water-tight containers or structures.
- ° No discharge of waste into the water shall be permitted except from those facilities which have received an NPDES permit from the State Water Control Board.
- ° Any alteration of the shoreline shall require a permit issued in accordance with the requirements set forth in this zoning code.
- ° The following additional performance standards should apply to all industrial uses:

Lighting. Exterior lighting shall be shaded wherever necessary to avoid casting direct light on any residential use.

Noise. Industrial uses shall not produce either continuous or intermittent noise at the property line at a level which causes harm to adjacent property owners.

Odor. Industrial uses shall not emit odors or odor-causing substances that can be detected at the property line.

Vibrations. Industrial uses shall not produce vibrations that can be detected at the property line.

Air Pollution, Smoke, Dust. Industrial uses shall keep air pollution and smoke at an acceptable minimum as determined by the Virginia Air Pollution Control Board and shall keep dust and other particulate matter borne by air from leaving the lot by using landscaping or other appropriate means.

Heat, Glare. Industrial uses that produce intense heat or glare shall only be conducted in a totally enclosed building.

APPENDIX D (CONTINUED)

Toxic Material. Industrial uses shall not emit toxic or noxious matter which is injurious to human health or comfort. Where such emission could be produced as a result of an accident or equipment malfunction, adequate safety precautions considered suitable for the industry involved shall be taken.

Explosive Material. Industrial uses shall not store, utilize or manufacture pyrophoric and explosive powders and dusts, or materials or products that decompose by detonation.

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